

MARINE REVIEW.

VOL. V.

CLEVELAND, OHIO, THURSDAY, DECEMBER 31, 1891.

No. 1.

New Year's Supplement.

A supplemental engraving of the Union Steamboat Company's steamer Chemung is presented with this issue of the MARINE REVIEW. The engraving is also a likeness of the steamer Owego of the same line, as the boats are duplicates in every respect, but it was reproduced from an elegant painting of the Chemung made by H. T. Koerner of Buffalo. These powerful freight steamers, running between Chicago and Buffalo in connection with the Erie railway need little introduction, as they are already well known in the lake marine. The Owego has a record between Chicago and Buffalo, of which the sailing distance is 892 miles, of 54 hours and 15 minutes, or an average of 16.44 miles an hour. The boats are operated with a regularity almost equal to a railway schedule in time. During the season of 1890 the Owego made twenty-five round trips between Chicago and Buffalo and the Chemung twenty-four and a half. Ten years ago, five trips for a steamer on the same route was considered fair work.

These boats were built by the Union Dry Dock Company of Buffalo. They are of steel with the usual double bottom for water ballast and their dimensions are:

Length over all	350 feet,	7 inches.
" Keel.....	324 "	10 "
Extreme beam.....	41 "	2 "
Molded depth.....	25 "	6 "

The engines for a single screw are triple expansion with cylinders 28, 42½ and 72 inches in diameter by 54 inches stroke and indicating 2,600 horse power. Steam is supplied by six boilers, each 11 feet 6 inches diameter by 11 feet 6 inches long. The machinery is supplied with all modern attachments, including the O'Connell greaser, manufactured by O'Connell & Cahill of Manistee, Mich.

The chief officers of the Chemung are Capt. W. Robinson and Engineer Henry C. Jordan, and of the Owego Capt. John Byrne and Engineer Fred. Rebbaum.

Northwestern Influence and the Canal Question.

One of the stories related in connection with the construction of the present Erie canal is that of a granger member of the New York legislature, who had presented all manner of arguments against the project, and, when finally voted down, declared in a most empathic way that the canal could not be built anyhow, "because Bill Brown's barn stood nigh square on the line." It has been said that the project for an outlet from the lakes to the seaboard is a dream with the people of Duluth and other northwestern cities, but there was, nevertheless, a great deal in the actions of the recent waterways convention at Detroit, considering Buffalo's opposition to any movement for a seaboard channel, that called to mind the story referred to. The delegates in the majority at that convention represented the commercial interests of the western and northwestern states, where brain and money have within a few years exerted a wonderful influence over the entire country. They showed a determination above all other things to have recognition given to this question of a deep waterway to the Atlantic, and the city of Buffalo will not stand in the way of such an improvement, with this influence back of it, if a favorable report as to its feasibility is received from the war department.

Canada with vastly inferior resources far surpassed this

country in expenditures for the improvement of waterways, and now it is announced that at the next session of Parliament an effort will be made to reconsider the whole question of canal dimensions, with a view to enlarging the Welland and St. Lawrence system to a depth of 20 feet and to proportionately increase the length and width of the present locks, so as to admit of through traffic to the Atlantic in the largest vessels now afloat on the lakes. This movement contemplates a revision of the scale of navigation for the canals of Canada, which was fixed by a mercantile commission over twenty years ago and which has since proven entirely insufficient. The Canadian government has already decided upon an increase in the dimensions of the lock at Sault Ste. Marie, Ont., that will make the works of the Dominion at this point fully equal to those on the American side. On the other hand, there has been a steady and marked decline in the quantity of grain delivered at tidewater by the Erie canal for the past two years, and an increase in the quantity of grain handled by the railroads, while the latter have a monopoly of all other kinds of freight. It has been left for the past season, however, to show the most extraordinary results in this regard. The railroads carried during 1891 more than double the quantity carried by the Erie canal.

These are the conditions that have aroused an interest throughout the northwest in this question of an outlet to the seaboard, and aside from all talk of preparations for defense of lake cities in time of war, they will receive serious consideration from lake vessel interests when the improvements now under way in the connecting waterways of the lakes are completed.

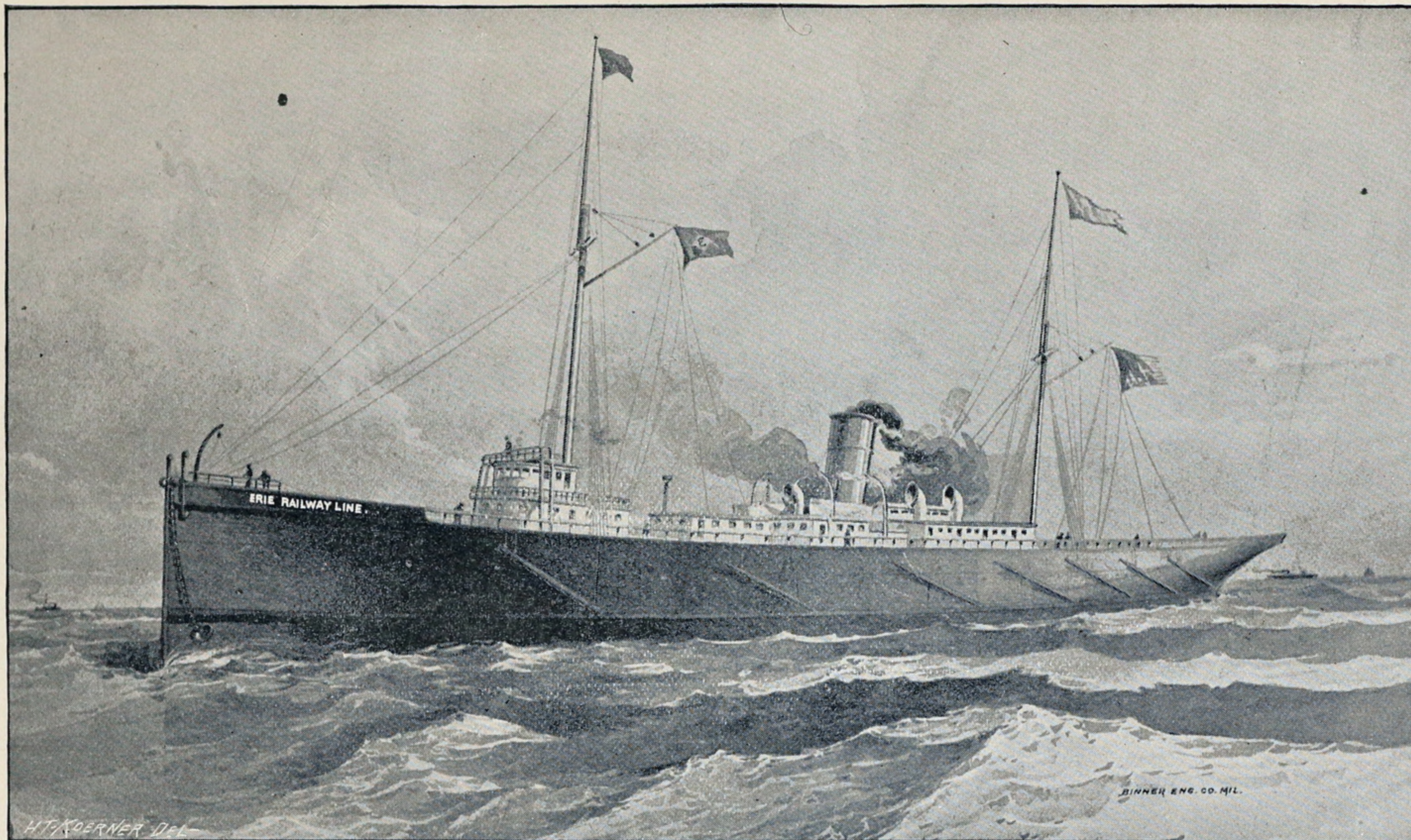
Need of a Liberal Canal Policy.

It may be true that the majority in the present Congress is decided upon a policy of retrenchment and that river and harbor appropriations will be scaled down to a very low point, but it does not seem fitting that, on account of the prevailing opinion in that regard, the water transportation interests should be lacking, even for a single year, in the great movement throughout the country for improved channels and harbors. The wonderful showing on the lakes alone of reductions in transportation charges through improved channels, testified to by army engineers, should be of sufficient force to warrant a continuance of river and harbor appropriations above all other needs of the country.

Some important data has been brought out of late regarding the policy of other countries in the matter of canals and rivers. France has 5,050 miles of navigable canals and improved rivers which are free of duty. Since the Franco-Prussian war of 1870 she has expended \$73,000,000 upon canals alone, and her political economists claim that even these free canals pay 5 per cent. in economizing the national wealth by the reduced cost of transportation. The total amount spent by France on her canals and rivers for the seventy-fourth year prior to 1887 was—

For improvement of rivers.....	\$188,333,200
For construction of canals.....	199,097,830
Total.....	\$387,430,600

Or nearly three times the amount expended in the United States upon rivers and harbors together. The great recuperative power of the French people, and their ability to pay their heavy war indemnity, may be attributed in large part to her admirable system of cheap internal transportation, as well as to the policy of protection.



Supplement to MARINE REVIEW, Cleveland, O.

Built by THE UNION DRY DOCK CO., Buffalo.

THE STEAMSHIP CHEMUNG.

New Lake Michigan Companies.

Special Correspondence to the MARINE REVIEW.

MILWAUKEE, Wis., Dec. 31.—M. M. Drake, manager of the Delaware & Lackawanna line steamers spent a day in Milwaukee last week and while here made inquiries concerning the depth of water at the entrance to various east shore harbors, with the view of ascertaining the most available terminal for the proposed transit line of steamers out of Kewaunee. While Frankfort appeared to be his choice, reports of the stage of water on the bar there were of such a highly unfavorable character as to preclude its selection. Grand Haven was also considered, but the limited car service afforded at that point proved a grave stumbling block. Manistee, therefore, must be chosen, temporarily at least, for the new line, and even there the water over the bar outside of the harbor piers is so shoal as to render ingress or egress extremely dangerous in ordinary rough weather. An impression—a mistaken one—has prevailed here that the Flint & Pere Marquette Railway, whose terminus is at Ludington, was under the control of the Delaware & Lackawanna Railway Company. The fact is, that this important eastern outlet passed into the hands of the Vanderbilts last season and now forms a portion of the New York Central system. The change froze the Delaware & Lackawanna out completely. Hence the extension of the Green Bay & Winona Railway to Kewaunee and the establishment of a line of steamers out of that port as an auxiliary for handling a share of the immense winter movement of flour, etc., eastward, has become necessary. The railway line is in running order, and according to latest advices from Manistee, everything will soon be in readiness for the proposed steamer line. The Lackawanna railway connections out of Manistee will be the Manistee & Northeastern and the Detroit, Lansing & Northern.

The Flint & Pere Marquette Railway management has accepted the resignation of Capt. Charles E. Moody, and he will leave the service tomorrow. Although no successor has yet been publicly announced, rumor assigns the command of steamer No. 5 to Capt. Joseph Robinson, last season in the steamer Petoskey. Capt. Moody is to leave for West Superior on Jan. 18, to look after the construction of the steamers for the Gladstone and Buffalo route at the American Steel Barge Company's works. They are to be of the whaleback type, and arranged to carry both grain and package freight. The plan of handling package freight in a barge of this kind has not as yet been explained.

Capt. Fred. C. Starke having decided to concentrate his capital in the ship yard and dry dock business, has disposed of his interest in the floating property of the Milwaukee Tug Boat Line, which embraces six tugs and the steamers Veronica and Helena, to his partners C. H. Starke, Conrad Starke and William H. Meyer. Sales of vessel property recorded at the Milwaukee custom office during December were: Schooner Experiment, John Larson to Thomas Peterson, of Milwaukee, one-half, \$400; steamer Colin Campbell, Olaf Anderson to Ole Hanson, of Milwaukee, one fourth, \$6,000; tug H. M. Van Ells, H. M. Van Ells to Theodore Pellen and Andrew Martin of Milwaukee, the whole, \$2,500; schooner Louise A. Burton, at auction, to Ben Scheftels, one-third, \$1,409.

Predicting a Dull Future.

Special Correspondence to the MARINE REVIEW.

DETROIT, Mich., Dec. 31.—The exhibit of new work under contract in lake ship yards as given in the MARINE REVIEW of the 17th inst. is astounding. If no more than the number shown were to be put on the keel-blocks it would be bad enough, but it is safe to say that the total of new tonnage for the season of 1891-92 will aggregate nearly or quite 100,000 gross tons. Vessel owners must face the situation and make the best of it, but how a profitable season can be figured out I am unable to see. A few weeks of activity and good prices in the spring until the accumulations of stocks of grain at Chicago and Duluth are cleared out, then what? Probably a repetition of the freight market of 1891, without, however, the fall boom in grain rates. Many years may pass before the country again produces such a crop as the last; besides, the urgent freight demand will likely abate before midsummer. In my humble opinion, there has been a good deal of inconsiderate talk about the large profits made by the lake carriers the past season, and which has no doubt influenced the placing of capital in new tonnage. I know a numbers of good boats, right here in Detroit, that no more than paid their spring fit-out bills. The same state of affairs probably exists at other places. If a good share of the \$5,000,000 which is being put into tonnage, were devoted to improving and enlarging terminal facilities at Lake Erie ports, would it not be better for all concerned?

Among the latest demands for lake commerce is that for the new, powerful man-o'-war style of revenue cutters. I have never been able to see what particular benefit to the lake marine is derived from the presence of these cutters. Their attempts to assist vessels in distress have never been worth mentioning; nor does it come within the province of the government to enter into the wrecking business. There is not a single point on the lakes that is not within a few hours reach of powerful tugs, many of them fitted and maintained especially to aid distressed vessels. For the

purpose of examining vessels' papers and preventing smuggling, a few good steam launches in the rivers and harbors would be just as efficient and far more economical than the cutters.

Capt. James Reid has undertaken to release the barge Minnehaha from the beach near Detour, the work to be done by April 1 next.

C. F.

A Million of Grain a Week.

Special Correspondence to the MARINE REVIEW.

DULUTH, Minn., Dec. 31.—Wheat continues to accumulate here at the rate of 1,000,000 bushels a week. Last week's table of stocks showed an increase of 1,051,000 bushels, while the showing on Monday of this week was 933,404 bushels. It is expected that after the first of January receipts will be considerably larger, though the heavier movement may not begin until Feb. 1. Advices from the country tributary to Duluth show that from 30 to 50 per cent. of the wheat yet remains in farmers' hands, while the country elevators are well filled. The stocks here Monday morning were 5,669,629 bushels and in addition there were 400,703 bushels afloat on vessels in the harbor. The stock of barley was 26,563 bushels, and that of flax 247,141 bushels, of which 73,314 bushels were afloat. The present rate of increase will fill the elevators by May 1, or sooner.

St. Paul and Minneapolis just now are doing much thinking about a canal to connect them with Lake Superior and are asking their representatives in Congress to secure an appropriation for a survey of the routes. A Duluth man who is conversant with the situation, an engineer, says the scheme is utterly impractical. He says: "There is an elevation of over 600 feet to get up out of the basin of Lake Superior before level ground is reached. This would cost, at a rough estimate, \$15,000,000 and probably \$20,000,000. Then there is a distance of 130 miles before we get to the Twin Cities. But it does not make any difference how far it is, nor does the drop of 200 feet to get to Minneapolis from the level above figure in the matter, for the single lockage of vessels up 600 feet will cost more than the present freight rates between Duluth and the Twin Cities. These rates are likely to be reduced in the future, but the cost of lockage can never be. So the canal can never become a reality."

Tonawanda's receipts of lumber during the season aggregated only 505,512,000 feet, against 718,658,900 feet in 1890. Canal shipments were 293,244,900 feet, against 363,569,620 feet in 1890. The total receipts of lumber by lake and rail, for 1891 were 530,394,500 feet, against 753,673,000 feet in 1890. The total canal and rail shipments were 745,000,000 feet, and the docks are left with comparatively little stock at the close of the year. Of iron ore Tonawanda received by lake 70,849 tons in 1891, against 25,369 tons in 1890 and 15,330 tons in 1889.

A Season's Business at Buffalo.

Buffalo's receipts of about 130,000,000 bushels of grain during the past season was the cause of a general increase in the lake trade. Following are some figures on the commerce of that port during 1891 as compared with 1890:

	1891.		1890.	
	Number.	Tonnage.	Number.	Tonnage.
Total vessels entered.....	5,444	4,495,705	4,891	3,838,532
Total vessels cleared.....	5,425	4,433,058	4,878	3,720,648

Shipments of anthracite coal to the different upper lake ports were as follows:

	1890 Net tons.	1891 Net tons.
Chicago.....	967,085	957,804
Milwaukee.....	416,473	608,139
Duluth.....	171,675	257,625
Superior.....	172,670	163,077
Toledo.....	86,945	69,619
Detroit.....	32,285	21,560
Racine.....	25,755	30,510
Gladstone.....	31,780	35,170
Green Bay.....	16,575	29,015
Sheboygan.....	.....	17,175
Marquette.....	16,440	20,934
Bay City.....	6,520	13,337
Saginaw.....	11,530	23,461
Ashland.....	8,350	12,075
Washburn.....	.....	8,090
Kenosha.....	.....	7,862
Menominee.....	.....	7,775
Escanaba.....	2,514	4,630
Sault Ste. Marie.....	4,775	4,075
Manitowoc.....	5,775	3,850
Alpena.....	9,000	1,030
Canadian ports.....	19,633	32,515
Miscellaneous.....	38,354	33,567
Totals.....	2,044,134	2,365,895

Buffalo vessel owners now control 321 vessels, measuring 164,070.02 gross tons. Of these 212 with a tonnage of 126,770.01, are steam, and 109, with a tonnage of 47,000.01, are sail.

Send 75 cents to the MARINE REVIEW for a binder that will hold 52 numbers.

Record of Speed and Big Cargoes.

[Masters or owners are invited to report improvement on this list.]

Iron ore: Lake Michigan—Maryland, Inter-Ocean Transportation Company, of Milwaukee, 3,322 gross, or 3,737 net tons, Escanaba to South Chicago, draft 16 feet 6 inches; E. C. Pope, Eddy Bros. of Bay City, 3,239 gross, or 3,628 net tons, Escanaba to Buffalo, draft 16 feet. Lake Superior—E. C. Pope, Eddy Bros. of Bay City, 2,828 gross, or 3,167 net tons, Ashland to Lake Erie, draft 14 feet 6 inches.

Grain: E. C. Pope, Eddy Bros. of Bay City, 125,730 bushels of corn, draft 14 feet 8 inches; Western Reserve, Peter Minch, of Cleveland, 112,431 bushels of wheat, Chicago to Buffalo; W. H. Gilcher, J. C. Gilchrist, of Cleveland, 114,982 bushels of corn, Chicago to Buffalo.

Speed: Owego, Union Line, of Buffalo, Buffalo to Chicago, 889 miles, 54 hours and 16 minutes, 16.4 miles an hour; Saranac, Lehigh Valley Line, of Buffalo, Buffalo to Lime-Kilns, 240 miles, 15 hours and 10 minutes, 16 miles an hour.

Iron Mining.

VALUE OF LEADING STOCKS.

Quoted by Chas. H. Potter & Co., No. 104 Superior St. Cleveland, O.

Stocks.	Par Value.	Bid.	Asked.
Cleveland-Cliffs Iron Company.....	\$100 00	\$.....	\$ 80 00
Champion Iron Company.....	25 00	.....	75 00
Chandler Iron Company.....	25 00	47 00	.....
Jackson Iron Company.....	25 00	.....	100 00
Lake Superior Iron Company.....	25 00	.....	.....
Minnesota Iron Company.....	100 00	.....	80 00
Pittsburg Lake Angeline Iron Co.....	25 00	.....	145 00
Republic Iron Company.....	25 00	24 00	25 50
Ashland	25 00	.....	.....
Section Thirty-three.....	25 00	6 00	.....
Brotherton.....	25 00	2 00	.....

Correspondents in Duluth and other places at the head of Lake Superior are evidently disposed to help the Mesaba range boom. One of them writes: "Particulars of the new iron finds on the Mesaba Range, in Township 58, Ranges 16 to 18, are just beginning to come out and show that these latest ore discoveries exceed anything yet found in the entire Lake Superior region. The signing of the contract with Donald Grant for the building of the Duluth-Mesaba Northern road has opened the mouths of the owners of some of the big mining properties on the new ranges. The projectors of the road are the owners of the Biwabik and Mountain Iron mines Messrs Merritt and A. S. Chase of this city, K. D. Chase and Donald Grant of Faribault, and others. The new mining territory lies from eight to twenty miles west of the line of the Duluth and Iron Range railroad at Mesaba. Last August the work of development was begun. Thirteen test pits were sunk to the depth of sixty feet, and a distance of 1,136 feet north and south and that much east and west show a solid vein of rich hematite ore, measured by the length, breadth and width of the vein at not less than 9,000,000 tons. There is one forty acres of very nearly solid iron known to be at least fifty-eight feet deep.

"The ore is of soft Bessemer, free from sulphur or silica, of dark color, and running 61 to 64½ per cent. pure iron. Specimens are shown that are so soft and free from hard substances that they can be whittled like soap. The vein is not vertical like that of the Minnesota mine, but horizontal. Owners of the property think they will find 20,000,000 tons just east of the Biwabik. The Cincinnati Iron Company secured lands a week ago, and went to work and has found the same vein, just as extensive as the Biwabik's and adjoining the Cincinnati on the east. The same rich find has been made in the Hale mine, west of the Biwabik; the Cantoan mine of the Minnesota Iron company has developed almost as great riches, and to the southwest, two sections comprising the Williston, Chamley & Co. mine, another great body of the same quality of ore is found, and still another location west is showing up very rich. From all accounts the mines being developed indicate a body of 50,000,000 tons of ore. The discoveries insure the building of the Duluth, Mesaba and Northern railroad from the mouth of Artichoke river to the mines, a distance of sixty-four miles, and the contract calls for its completion by Aug. 1 next. The Duluth and Iron Range road will also build a branch to the new mines this year. Several men have suddenly found themselves the possessors of great fortunes. Of them John McKinley was trying to sell pine land a year ago for \$2 a thousand for the pine and \$2 additional for the land. Today \$1,000,000 would scarcely touch it."

At the 300 foot level of the Zenith mine, Vermillion range, a 35 foot vein of ore is being cross cut and the indications are that the property is fast getting into shape to make its first output in 1892. The company's legal complications are said to be about settled. In reply to the question whether the mine would ship 25,000 tons next year, H. M. Bradley, one of the larger

stockholders stated that if they didn't expect to do better than that they would discontinue work entirely, which is really an assurance that the mine will make a commendable output. —Tower Iron Journal.

All the Gogebic mines are being worked actively and in a number of cases mining forces have been increased. The Colby increased its force 300 men a few days ago, and it is expected to have 1,000 men on the pay roll by March 1.

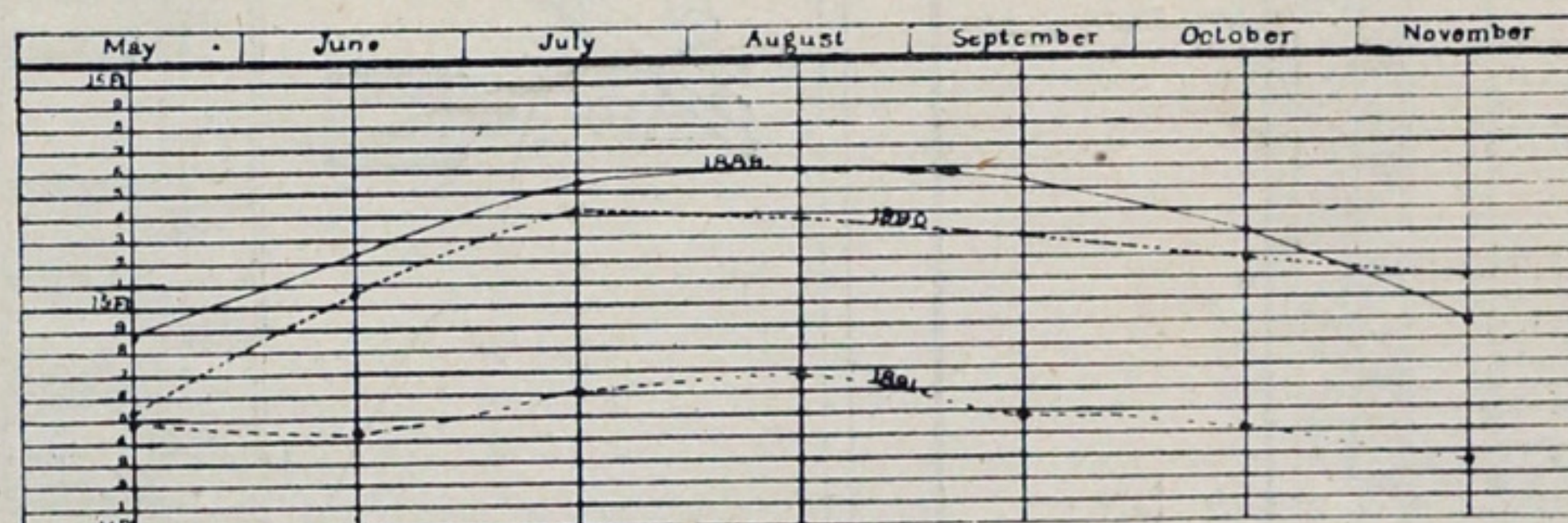
Work will be resumed shortly at the cage shaft of the Lake Superior mine, damaged by fire a short time ago. The water is out of the mine and it was found that the fire was confined mainly to the shaft. The loss was not great.

Officers of the Buckeye Mining Company, elected a few days ago, are as follows: President, A. E. Mountain, Marinette; vice president, A. E. Rhodde, Milwaukee; secretary and treasurer, George C. Collins, Marinette; board of directors, James Moore, Marinette; Charles Loughrey, Florence; John M. Clark, L. M. Larson, Marinette.

Chandler stock is again higher, being quoted at \$47 bid. The fourth shaft of the mine is down to a depth of about 50 feet and the work is being pushed as rapidly as possible. Steam power is applied to work on the new shaft.

Effects of Low Water.

In the consideration of freights and other matters pertaining to the lake business of the past two seasons, few shippers or vessel owners have given to the question of low water the consideration of which it is deserving, and it is not probable that they will do so for the coming season. The importance of this feature of the lake trade, especially in Lake Superior business, is, however, fully shown in the report of Gen. Poe for the past season, printed elsewhere. Gen. Poe figures, in a very conservative way, that the vessels trading to Lake Superior alone during 1891 would have carried, if the available depth of water had even been equal to that of 1890, (next lowest recorded) 1,461,359 tons more than they did, and would have brought the canal business for the season to 10,350,359 tons, or say 10,000,000. The following diagram, showing water level curves at the canal for the past three seasons, will prove interesting in this regard:



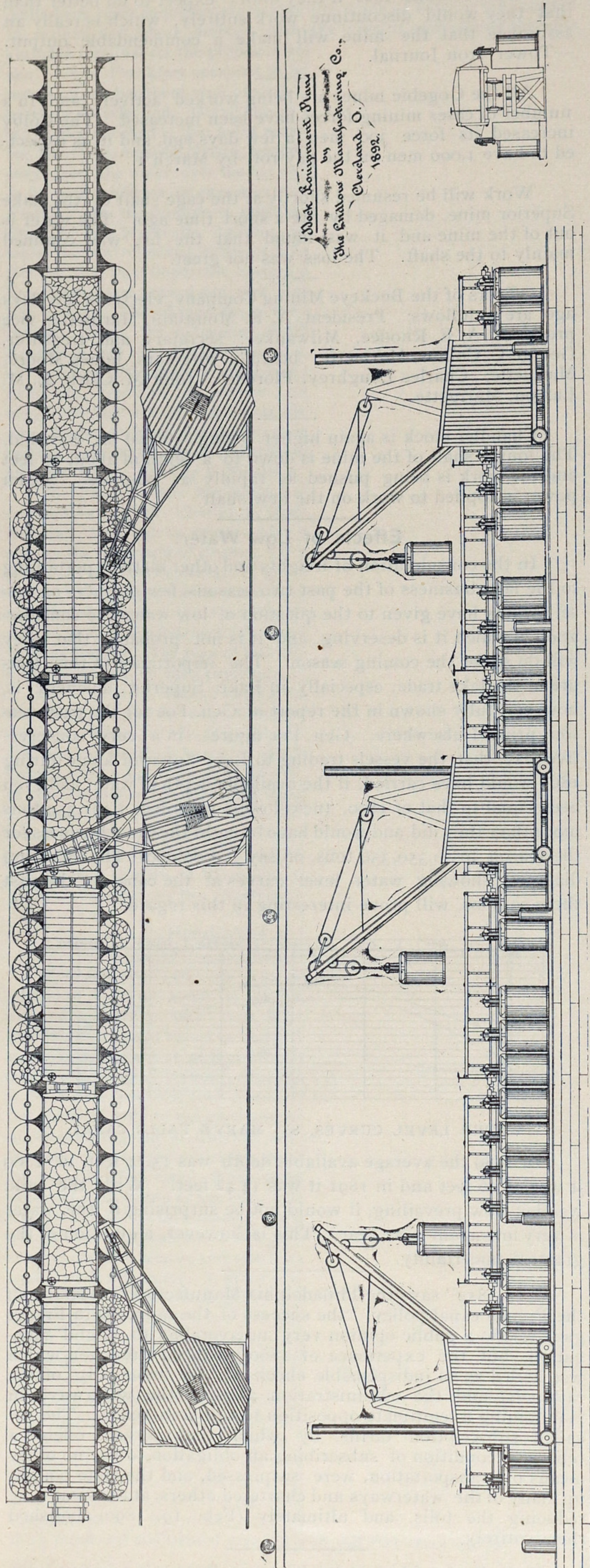
WATER LEVEL CURVES, ST. MARY'S FALLS CANAL.

In 1889 the average available depth was 15.14 feet, in 1890 it was 15.06 feet and in 1891 it was 14.42 feet. With the mild weather now prevailing, it would not be surprising if the water is very low again next year. This is, however, a question of the greatest uncertainty.

"In 1852" says the Philadelphia Manufacturer, speaking of the French canal policy, "the success of the railroads in France gave rise to a public opinion very unfavorable to inland navigation, but the experience of 1860 produced a reaction which was hailed as an indispensable check on the monopoly of the railroads, and the administration assisted the waterways in maintaining a legitimate opposition to the iron roads. The so-called subscription tariffs, by which the railroads offered a rebate on condition of subscribing an obligation to use no other means of transportation, were suppressed, and the state bought up many of the waterways and chartered others, at the same time reducing the tolls, and ultimately (Feb. 19, 1890) abolished them entirely."

H. D. Root, of Lorain, has begun work on a tug 65 feet long, 14 feet beam and 6 feet 8 inches molded depth for J. W. Smith & Co. of Lorain.

Plan of Dock Equipment for Rapid Handling of Soft Coal.



DOCK EQUIPMENT PLAN, LUDLOW MANUFACTURING COMPANY, CLEVELAND, O.

The accompanying engravings show a portion of the plans of the Ludlow Manufacturing Company of this city for a dock equipment, specially adapted to rapid handling of bituminous coal. Improvements in coal handling machinery have not kept pace with the great advance made in the ore business, but it is evident now that within a short period the present methods will be very much changed. Larger derricks and buckets of four and five tons capacity will take the place of the plants now in use and the coal will undoubtedly be dumped from the cars instead of being shoveled as at present. The increasing lake traffic in coal between the mines of Ohio and Pennsylvania and the northwest, which has now reached an aggregate of about 3,500,000 tons for a single season at Ohio ports alone, demands improved dock facilities, and the different companies engaged in equipment work are directing a great deal of attention in this direction.

The plan of the Ludlow company, shown here, presents many improvements, being guaranteed to load 300 tons an hour. In the first drawing the ground plan of machinery and cars with the arrangement of buckets and sockets at the sides of the cars, to cause all coal to fall into the buckets, is shown, while in the lower drawing a side elevation of the plant is presented. The buckets used are what are known as the Ludlow buckets of four tons capacity. Six are required on each side of the car and their dimensions are $5\frac{1}{2}$ feet in diameter by 7 feet high. The car is the Ludlow side-dumping gondola of about twenty-five tons capacity.

The car is elevated about 5 feet, as shown in the small cross sectional drawing, and the buckets are so fitted to the sockets as to not admit of any coal falling behind them. A plant after which this system is planned has been in use at Sandusky for ten years.

The car is one that in ordinary service is a gondola, but when brought to the dock, or such point as may be equipped with the necessary power, can be dumped inside of one minute from both sides into the buckets. As the twelve buckets hold forty-eight to fifty tons, two cars must be dumped in order to fill them. The buckets are tripped automatically with another device patented by Mr. Ludlow. The derrick to be used is the McMyler new 10-ton machine, which is guaranteed to put aboard a bucket every two minutes. This machine is a self-propeller and is being operated with great success in connection with the work of constructing the new St. Mary's Falls canal lock. Seven of the machines are now in use on this work. They were guaranteed to carry ten tons and travel 800 feet a minute and they have been fully up to requirements.

The working of the car in connection with this plan of dock equipment will be illustrated and explained later, probably in the next issue.

Another Interesting Report From Gen. Poe.

In a letter accompanying his report to Gen. Casey, chief of army engineers, on the St. Mary's Falls canal traffic during 1891 Gen. Poe discusses the canal business in a very interesting manner. Following is a copy of the letter and the report:

UNITED STATES ENGINEER OFFICE.
34 West Congress Street.

DETROIT, Mich., Dec. 16, 1891.

Brig. Gen. Thomas L. Casey, Chief of Engineers, U. S. Army, Washington, D. C.—Sir: I have the honor to submit the following report upon the commerce passing St. Mary's Falls canal, during the season of 1891, just closed. At this work statistics for the season are necessarily those of the calendar year.

The canal opened for navigation April 27, 1891, and closed Dec. 7. The season was therefore 225 days long, or three days shorter than in 1890. The average number of vessels passing per day for the whole season was 45.3 and for the months of June, July, August and September, the average was 54.6. The

size of the vessels continues to increase, as is shown in the following statistics:

In 1887 the average registered tonnage per vessel was 626.3 tons

" 1888 "	"	"	"	"	"	"	701.5 "
" 1889 "	"	"	"	"	"	"	790.5 "
" 1890 "	"	"	"	"	"	"	833.8 "
" 1891 "	"	"	"	"	"	"	862.1 "

The total registered tonnage for the season falls 53,750 tons short of that for 1890, and the freight tonnage was 152,454 tons less. The following discussion of the appended statistics may not be inappropriate:

For the whole period since 1881, the iron ore carried through the canal has been 47 per cent. of the total freight, and in 1889 and 1890 it was more than 50 per cent; therefore the freight may be divided into two nearly equal parts, one of which was the iron ore, the remainder being the aggregate of all other freights. The percentage of increase since 1881 falls between 12 and 39 each year, the average being 22. During 1890 the freight, other than iron ore, amounted to 4,266,445 tons, and for 1891 5,328,548 tons. This shows an increase of 25 per cent. in the freight of 1891—other than iron ore—over 1890; or a little more than the average increase for the preceding ten years. Hence the decrease in iron ore freight alone is sufficient to explain why the business of 1891 did not show the usual increase. There were other causes, however, which materially affected the volume of the season's business, and they will be referred to later. The falling off in iron ore freight was predicted, with certainty, a year ago. It was due to causes so widespread and long continued that a discussion here could hardly be made complete and satisfactory.

The freight of wheat and wheat products was abnormally large. Excluding iron ore and wheat in 1890, the remaining tonnage was 3,725,866 tons. The corresponding freight for 1891 was 4,340,660 tons. Hence the increase in freight, exclusive of iron ore, was 8 per cent., which indicates quite a falling off from the average rate of 22 per cent. for the last ten years, and shows that if the wheat crop of the northwest had not been unusually good this season, there would have been a slight decrease in the volume of freight other than iron ore.

The foregoing relates solely to tonnage. If we consider the value of the season's freight, we find a very large increase over any other. The average yearly increase in the value of the freight transported since 1881 was about 15 per cent., but for the season of 1891 it was about 25 per cent. The cause of this great increase in valuation is plainly due to the very large wheat crop. Since we are not likely to be immediately favored with another such crop, a decrease in valuation may be reasonably predicted for next year. But the failure to maintain the record of annual increase in freight tonnage is due, in a great degree, to three causes other than the decrease in iron ore tonnage. The first of these is the fact that the stage of water in the lakes, and consequently the depth available at the canal, was the lowest of which we have any record. In 1889 the average available depth was 15.14 feet, in 1890 it was 15.06 feet, and in 1891 it was 14.42 feet. The average for 1891 was therefore .64 feet, or .6 inches lower than in 1890, which at a reasonable estimate of 20 tons to an inch of draft, corresponds to an average of (say) 150 tons for each registered vessel. That is, if the available depth of water in the canal during 1891 has been equal to that of 1890, (next lowest recorded) the same 9,744 vessels which carried 8,888,759 tons in 1891, would have carried 1,461,359 tons more than they did, or an aggregate of 10,350,359 tons; or, say 10,000,000. This is no violent estimate, but is, I think, quite within the truth. The next cause was the intentional delay of the vesselmen in putting their vessels in commission in the spring. This amounted to quite two weeks in the case of many of the largest carriers. No attempt is made to estimate the effect of the delay, but it must have been considerable. The third cause was due to the sinking of the steamer Susan E. Peck, at "the elbow," in St. Mary's river, by

which navigation was totally suspended from 1:10 P. M., Oct. 11, to 3 P. M., Oct. 15, a period of full 5 days. Through this accident 275 vessels were delayed an aggregate of 827 days and 5 hours, or an average of about 3 days each, during which time they would have carried through the canal about 150,000 tons of freight if they had been free to move. This fairly off-sets the delay during the preceding season, due to the broken emptying valve.

In view of the foregoing, it would be a conservative estimate to say that but for the conditions stated, the freight through the canal would have amounted to 10,500,000 tons during the season of 1891. In estimating the value of the commerce passing through the canal, it is deemed advisable to adhere to the same prices per unit first adopted in 1885. It is believed that these constitute a fair average and afford a better basis for comparing the business from year to year than if they were amended to conform to the prices actually prevailing.

Very respectfully, Your obedient servant,

O. M. POE,

Colonel, Corps of Engineers, Bvt. Brig. Gen., U. S. A.

The comparative statement of the amount and value of commerce through the canal for the calendar years 1890 and 1891 follows:

ITEMS.	QUANTITY.		INCREASE.		DECREASE.	TOTAL VALUATION.	
	1890.	1891.	Amount.	Per Cent.	Amount.	Per Cent.	Price Per Unit.
Vessels*.....	10,557	10,191	11	0	366	3	\$ 3.50
Lockages.....	4,970	4,981	11	0	53,750	1	5 00
Tonnage, registered.....	8,454,435	8,400,685	53,750	1	152,454	2	98
Tonnage, freight.....	9,041,213	8,888,759	152,454	2			50 00
Passengers.....	24,856	26,190	1,334	5			17 00
Coal, (hard and soft).....	2,176,925	2,507,532	330,607	18			200 00
Flour.....	3,239,104	3,780,143	541,039	17			3 50
Wheat.....	16,217,370	38,816,570	22,599,200	139			18 00
Grain, (other than Wheat).....	2,044,384	1,032,104	1,012,280	50			153 79
Manufactured iron.....	93,615	42,560	51,055	55			10 00
Pig iron.....	22,712	27,181	4,469	19			60 00
Copper.....	179,431	234,528	55,097	31			
Iron ore.....	43,729	69,190	25,461	58			
Lumber.....	4,774,768	3,560,213	1,214,555	25			
Silver ore and bullion.....	361,929	366,305	4,376	1			
Building stone.....	3,432	1,731	1,701	50			
Unclassified freight.....	47,973	44,080	3,893	8			
	371,294	417,093	45,799	12			
							Totals,
							\$102,214,948 70
							\$128,178,208 51

*Included in unclassified freight, for 1891:
Wool.....2,602 tons.
Hides.....460

VALUATION BASED ON ESTIMATES OF 1885:

Valuation for 1885.....	\$53,413,472 13
" " 1886.....	69,080,071 95
" " 1887.....	79,031,757 78
" " 1888.....	82,156,019 97
" " 1889.....	83,732,527 15
" " 1890.....	102,214,948 70
" " 1891.....	128,178,208 51

*Steamers.....7,339
Sails.....2,405
Unregistered crafts.....447
Total.....10,191

Canal was open to navigation during season of 1890, 228 days.
Canal was open to navigation during season of 1891, 225 days.

We are indebted for the above letter and statement to Lieut. Chas. L. Riche, who kindly sent them to us in the absence of Gen. Poe.

Write "MARINE REVIEW, 510 Perry-Payne Bldg., Cleveland, O.," on an envelope, write your address on a slip of paper, enclose a dollar bill, and mail it for six month's subscription to the only illustrated marine paper on the lakes.

MARINE REVIEW.

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

JOHN M. MULROONEY, } PROPRIETORS.
F. M. BARTON, }

HOMER J. CARR, - - - Associate Editor and Manager Chicago Office,
210 South Water Street.

Published every Thursday at No. 510 Perry-Payne Building, Cleveland, O.

SUBSCRIPTION—\$2.00 per year in advance. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department contain the names of 3,510 vessels, measuring 1,063,063.90 tons in the lake trade. In classification of this fleet the lakes have more steamboats of 1,000 to 2,500 tons than the combined ownership of this class of vessels in all other sections of the country. The classification is as follows:

Class.	Number.	Tonnage.
Steam vessels	1,527	652,922.25
Sailing vessels.....	1,272	328,655.96
Canal boats.....	657	67,574.90
Barges.....	54	13,910.09
Total.....	3,510	1,063,063.90

According to the report of William W. Bates, United States commissioner of navigation, 46 per cent. of the new tonnage of the country was built on the lakes during 1889. This is a percentage greater than the work of the Atlantic coast and western rivers combined, and almost equal to the whole work on the Atlantic and Pacific coast. In 1890 the tonnage built on the lakes is but very little less than that built on the Atlantic and Gulf coasts. Tonnage built on the lakes during the past five years was as follows:

	No. of boats.	Net Tonnage.
1886.....	85	20,400.54
1887.....	152	56,488.32
1888.....	222	101,102.87
1889.....	225	107,080.30
1890.....	218	108,515.00
Total.....	902	393,597.03

Annual tonnage entries and clearances of the great seaports of the world, for 1889: New York, 11,051,236 tons; all seaports in the United States, 26,983,315 tons; Liverpool, 14,175,200 tons; London, 19,245,417 tons.

Tonnage passing through Detroit river during 234 days of navigation in 1889, amounted to 36,203,606 tons. Ten million tons more than the entries and clearances of all the seaports in the United States, and three million tons more than the combined foreign and coastwise shipping of Liverpool and London.

St. Mary's Falls and Suez canal traffic: Number of boats through St. Mary's Falls canal in 1890, 234 days of navigation, 10,557; tonnage, net registered, 8,454,435. Number of boats through Suez canal during 1890, full year, 3,389; tonnage, net registered, 6,890,014.

Entered at Cleveland Post Office as Second-class Mail Matter.

BRADSTREETS has recently printed some articles that have undoubtedly resulted in a great deal of benefit to lake commerce, and that journal is, as a rule, well informed in matters pertaining to the lake marine. An editorial in its last issue, reporting conclusions of the Detroit convention, is liable, however, to result to the disadvantage of lake interests seeking appropriations from Congress for channel improvements. The editorial, which was evidently written from a poor report of the proceedings of the convention, says that, "the bill recently introduced into the United States Senate providing for an appropriation of \$10,000 to be expended by the United States engineers in the determination of the feasibility of making a ship-canal connection between the waters of Lake Erie and the upper Ohio river was approved, and Congress was requested to formulate a definite plan whereby the convict labor of the several states may be concentrated and utilized in the construction of a ship canal from some point on the eastern shore of Lake Erie or Lake Ontario to the seaboard as soon as the most available route can be determined by the engineer corps of the army." This is all a mistake, as the resolutions referred to, as well as several others of a special nature were all buried in their reference to the committee on resolutions. The call for the Detroit convention was framed with a view to avoiding all schemes, through which localities sought special aid. It was highly successful in this regard.

It is evident that the war department is not pleased with the responsibility placed upon it by that portion of the last river and harbor act pertaining to obstructions in the navigable waters of the United States. Last week acting Secretary Grant sent to the Senate the reply of the war department to the resolution of Senator Dolph, which was prompted by the Canal street bridge trouble at Chicago. This resolution asked the department to state whether the provisions of the river and harbor act of 1890 in regard to the obstruction of navigable rivers was being enforced, and if not, why not? The reply was prepared by Chief of Engineers Casey. It contains a list of the bridges which were considered obstructions to navigation and in which alterations so as to render navigation through or under them reasonably free and easy were ordered to be made. With reference to that part of the resolution directing a report as to what, if any, further legislation is required to secure the prompt enforcement of the provisions of the act the acting secretary says he concurs in the remarks of the chief of engineers that the law has not been in force long enough to ascertain its practical effect or whether further legislation will be necessary.

WITH Congressmen W. E. Haynes of Ohio, T. A. E. Weadock and S. M. Stevenson of Michigan on the river and harbor committee the lakes have not fared badly. Two of these, Messrs. Haynes and Weadock, are members of the majority and they can be depended on to do all that lies in their power for the interest of lake commerce. Chairman Blanchard of Louisiana as well as Mr. Henderson of Illinois were among the Congressional party that made a tour of the lakes last summer. They were given an opportunity to study the commerce of the lakes and both of them were very earnest in expressing opinions as to the magnitude of the business between Duluth and Lake Erie and their desire that liberal appropriations should be granted for further aids to navigation.

THE house committee on rivers and harbors, in which the lakes are very much interested, is constituted as follows: N. C. Blanchard, Louisiana, chairman; T. C. Catchings, Mississippi; Charles Stewart, Texas; R. E. Lester, Georgia; R. H. Clarke, Alabama; W. E. Haynes, Ohio; T. A. E. Weadock, Michigan; W. A. Jones, Virginia; Charles H. Paige, Rhode Island; Samuel Byrnes, Missouri; T. J. Henderson, Illinois; Binger Hermann, Oregon; S. M. Stephenson, Michigan; W. A. Stone, Pennsylvania; J. A. Quackenbush, New York. Roger Q. Mills of Texas is chairman of the committee of commerce.

ALL vessels not having names on their bows are now subject to a fine. The time allowed for this change was within the year 1891 which has just gone by. Customs officers on the lakes may not enforce the law until the opening of navigation next spring, but they have not said that they will not do so. The names must be painted, or carved and gilded, in Roman letters in a light color on a dark ground, or in a dark color on a light ground, and to be distinctly visible. The smallest letter used shall not be less in size than four inches.

Whaleback Package Freighters.

It is given out by the American Steel Barge Company that the two whaleback package freight steamers building at West Superior are to run between Gladstone and Buffalo in connection with the "Soo" railway, which has for two or three seasons past been doing some business out of Gladstone. The "Soo" is the American line of the Canadian Pacific, and through a company now being organized in Milwaukee, Canadian Pacific interests will control the boats. They will be 320 feet long, 42 feet beam and 25 feet deep. The increase over other whalebacks in the depth of these boats is said to be on account of the gangways, which will be so constructed as to take in a part of the "tumble-home" portion of the hull.

Bills Having a Bearing on the Lake Marine.

A few of the large number of bills bearing upon transportation matters already introduced in the Senate are of special interest on the lakes, but none of them are important in the sense that there is any indication of their becoming laws. Two of the canal schemes are recognized to the extent of an introduction of bills. Senator Quay asks for an appropriation of \$10,000 for a survey in connection with the Lake Erie-Ohio river canal scheme, which the Pennsylvania legislature introduced a short time ago. This project is distinctively a Pennsylvania affair and will get no support excepting from Pennsylvania members of Congress. There is nothing practicable about the waterway proposed, and the ore producers and vessel owners of the lakes, as well as the furnace owners of Pittsburgh, who should be supposed to show most interest in such a canal, have paid no attention to it. Senator Davis' bill asking for \$1,000,000 to begin work on a canal around Niagara Falls is also of the matter of form kind, as shown by the action of the Detroit waterways convention, which discussed with a great deal of caution the question of even asking Congress for the appointment of a commission to consider the matter of an outlet for lake commerce below Buffalo. The proposition of Congressman John Lind of Minnesota to invite negotiations with Canada, for the purpose of securing a speedy enlargement of the Welland and St. Lawrence canals seems sensible enough, but it is very doubtful if any attention would be given by Canada to such a proposition. Congressman Lind says he will introduce among the first measures going before the House a resolution with this end in view.

Mr. Frye is the author of the bill for the establishment of a marine board. The measure is in all respects similar to that introduced in the last Congress and recommended by the treasury department. It makes no provision for the establishment of a marine department, and offers little relief to the present overburdened treasury department. The board is to consist of one of the assistant secretaries of the treasury, the chairman of the light-house board, the supervising inspector general of steam vessels, the chief of the marine hospital service, general superintendent of the life saving service, commissioner of navigation, superintendent of the coast and geodetic survey and the chief hydrographer of the navy. Under the proposed law these officers would simply meet four times a year and advise the secretary of the treasury in matters of a marine nature. They would also look to the collection of commercial statistics. The measure is not one of an inspiring nature, as it would really make little change in the management of marine matters at Washington.

Report of Experimental Trip,

MADE UPON SCREW STEAMER E. P. WILBUR TO THE BUILDERS,
THE GLOBE IRON WORKS COMPANY, CLEVELAND, O.,

[BY GEO. C. SHEPARD.]

Principal amongst the objects of this experimental trip was to get data relative to the coal and water consumed, whilst the steam plant was in its several conditions, and especially was it desirable to get comparative results from the use of the system of forced draft.

The only means to weigh the coal was to use a spring balance and an ash bucket, taking coal from each of the three bulkhead doors and dumping in piles inside of the stoke-hole when weighed out. The space for working in the stoke-hole was very limited, and those weighing coal were in the firemen's way, so that no coal was weighed until after the fires were cleaned, and then the coal, being fine and very dirty, coal weighing was suspended at the end of two hours to allow a chance to clean the fires again. Several times after coal was weighed out did we find the firemen using from bunker, rendering the test "nil." In the first test weighed out 47 buckets, and no two varied from each other more than two pounds, so that for that quality of coal, used an average of 109 lbs. net per bucket. Coming down stopped at Detroit, and took on a few tons of better quality of coal, and as soon as we were under way dropped the engines into the 3d notch and made test No. 4, weighing both coal and ashes. The ashes in

the Buffalo coal amounted to 29% of the whole, while the Detroit coal only contained 20%.

The system of forced draft consisted of a fan on the spar-deck in boiler house; this was connected with a reservoir pipe along in front of boilers with top of pipe flush with stoke-hole floor, conduits led from the reservoir pipe to the under side of the grates in each furnace. We could only run the fan during the after-watch when the first engineer and oiler could attend to it. Then two men could in half an hour make connections, and the fan was run until ash pans were full and the fires dirty. In the two instances when we tried the forced draft the steam pressure at first fell, but soon rose and remained at a high point easier than when running under normal conditions; also the fires were brighter and the firehold cooler than before. Ordinarily the temperature of the stoke-hole was over 100 deg. F.

To measure the feed water, arranged two barrels to be filled from hot well through pony pump, and emptied into boilers through feed pumps on engine. The barrels were filled and emptied alternately and accuracy was insured by floats and lines to mark points of "full" and "empty." Before the test the barrels were placed on scales and the weight of the water necessary to fill the barrel from "empty" to "full" obtained. The data which we were able to get accurately and the results therefrom are embodied in the following Tables VI and VII.

While the coal and water tests were being made, readings of the engine room log were taken every half hour, and at the quarter hour indicator diagrams were taken. To use these data in the following tables, took the mean of the reading made during the test, and for the indicated horse power, used the average mean effective pressure of each cylinder with the revolutions per minute taken from register readings at beginning and end of test.

[TO BE CONTINUED.]

In General.

The King Iron Bridge and Manufacturing Company of Cleveland is shipping an average per month of 1,000 tons of structural iron of all kinds.

From Newport News last week the steamship Cape Comino took 203,637 bushels of oats for London. It was the largest cargo of grain ever shipped from an Atlantic port and probably the largest ever shipped from any port in this country.

Engineer Ketchum of the Chignecto ship-railway is engaged in an effort to secure from the Canadian government financial aid to further prosecute the work. Three millions and a half of English capital has already been expended, and it is estimated that a million and a half more will be required to complete the undertaking.

The steel steamer building at the yard of the Craig Ship Building Company, Toledo, is for the owners of the steamer Germania and will receive the Germania's boiler and engine. She will be 210 feet over all and 40 feet beam and will carry 1,200 M feet of lumber. The same officers who have been so successful with the Germania for several seasons past will have charge of the new boat. They are Capt. C. A. Peltier of Detroit and Chief Engineer Robert Hannon of West Bay City. The new steamer will tow nothing.

Toledo's lake coal trade will undoubtedly show a large increase next season. In addition to the general development of the lake shipping trade in Ohio coal, the Pennsylvania Railway Company is making preparation for the shipment next season of coal from the Connoton district by way of Toledo. The Pennsylvania Company is the owner of the Toledo dock property now used by the Columbus and Hocking Valley Coal and Iron Company, and it is expected that they will soon take these docks for coal shipping purposes. For next season's business they have arranged to have a plant constructed in the lumber district below the Columbus and Hocking Valley docks.

Mr. Samuel Mather and others of the firm of Pickands, Mather & Co., who are having two whaleback barges constructed for the ore trade, have organized the Huron Barge Company with a capital of \$500,000. The articles of incorporation, intended to cover a wide scope, say that the company is formed for the purpose of owning steamships, sailing vessels and barges for the transportation of ore, coal and other freight upon and over the seas, navigable rivers and great lakes, with power to construct or purchase vessels and machinery, and to do a towing business on the seas, control docks and do a general stevedore, docking and commission business.

Excelsior Marine Benevolent Association.

At the annual meeting of the Milwaukee lodge last week, the following officers were chosen for the ensuing year: President, James Leisk; first vice-president, F. C. Maxon; second vice-president, W. P. McGregor; financial and recording secretary, John McSweeney; treasurer, F. C. Starke; marshal, John Cochran; warden, John Gorman; sentinel, Henry Consaul; chaplain, William Jamieson. James O'Brien and Charles Gnewuch were elected members. The case of Capt. Elmer W. Craine, the defaulting and absconding master of the steamer W. H. Wolf, came up in the shape of a resolution of expulsion from the lodge which was adopted. The installation of officers will occur Jan. 5, and is to be followed by a spread.

A meeting of the Port Huron lodge was held Saturday. The meeting rooms have been draped out of respect to the memory of the late Capt. Cotton. Capt. Clark of Buffalo was a visitor at the meeting. The next meeting will be held Saturday, Jan. 2, so that all the members from out of town can be present. A vote will be taken on the question of granting Marine City the privilege of starting a lodge. The election of officers for the coming year will also take place.

The Bay City lodge has resumed meetings with all of the earnestness of last winter. President Pierce and Secretary Weeks are both very much pleased with the indications of another winter of successful meetings.

Around the Lakes.

Fire damaged the tug Folsom at Lorain, Monday. She was sunk after the fire had gained considerable headway.

The new war cruiser Detroit, named for the City of the Straits, will be presented by the city with a painting of a view of the city from the river front.

Capt. George P. McKay will go to Washington next week to represent the Cleveland Vessel Owners Association in matters pertaining to lake improvements.

A meeting of the board of steamboat inspectors was to have been held at Toronto on Dec. 15, but a letter from Inspector Johnston says it was postponed by the minister of marine. The cause of postponement is not given.

The Polson Iron Works of Owen Sound is working on a duplicate of the Canadian cruiser Constance, launched a few days ago and intended for service on Lake Huron. The second boat will be used on the Gulf of St. Lawrence.

Transferred: Schooner Racine, United States marshal at Cleveland to Capt. M. Driscoll, Cleveland, \$300; schooner Southwest, Capt. S. H. Fish to M. A. Bradley, Cleveland, private terms; schooner J. I. Case to James Corrigan, Cleveland, \$22,000.

Thirty-eight Scotch boilers are now under construction at the Lake Erie Boiler Works, Buffalo. This concern is employing 260 men. They have contracts with the American Steel Barge Company for eleven boilers and will also build the boilers of the Anchor Line steamer building at the yard of the Union Dry Dock Company, Buffalo.

Canadian Pacific steamers, the Alberta, Athabasca and Manitoba, took 46,289 tons of merchandise from Owen Sound to Fort William during the past season. Their return cargoes of mill stuff from the northwest aggregated 36,518 tons. The passenger traffic on these boats was unusually heavy. The Athabasca and Alberta are to get during the winter promenade decks similar to that on the Manitoba.

Two boats are being built at Napoleon Gregnon's ship yard, Duluth, for the Duluth Sand and Tile Company. One of them, a tug 75 feet long and 16 feet beam, is being built for the sand and gravel trade, and will carry two large rotary sand pumps, as well as a large force pump and an adjustable elevating apparatus. This boat will tow two of the Osborne patent sand scows. The cost of the new plant will be about \$12,000.

St. Joseph & Lake Michigan Transportation Company is the name of the concern that will operate the steamers Lora and Ossifrage the coming season. The incorporators are the Hon. F. W. Wheeler of Bay City, John S. Williams of Terre Haute, Ind., and Capt. J. Langley of St. Joseph. The steamers will run from St. Joseph to Chicago, and if business will warrant, a line will also be run from St. Joseph to Milwaukee. The boats are being improved at West Bay City.

Big Increase in the Steel Rail Business.

Steel rail manufacturers of this country have now orders on their books for rails valued at over \$20,000,000 to be delivered next year. Compared with this time last year, it will require in this trade alone 350,000 to 400,000 tons of raw iron to meet the increased demand. Unless all indications fail, the year of 1892 will show the largest business in the history of the iron and steel trade this country ever experienced. The shipping interests of the lakes will, of course, be benefited by prosperity in this line, as a big demand for iron ores of the Lake Superior district, added to the heavy movement of grain already assured, will more than counteract the increase in new tonnage to leave the ship yards next spring.

Affairs in Admiralty.

A summary of the findings of Judge Coxe, United States district court, New York, in the Wales-Canisteo case, which is of special interest on the lakes, appears in the last issue of the Federal Reporter, and as it was written by the court it is here reproduced: "On a clear, still day, the steamer Canisteo was passing down Niagara river, in the channel between White's island and the main shore, intending to round the foot of the island and get a tow from its opposite side. As she reached the foot of the island, she sighted the tug Wales with a tow, about opposite the middle of the island, descending the middle of the main channel, which is here about 2,300 feet wide. The Canisteo signaled that she wished to pass next to the island, to which the Wales assented. As the Canisteo entered the main channel, she put her helm hard a-starboard, but the swift current prevented her from swinging up stream as quickly as she otherwise would have done, and she struck the Wales when about mid-stream and under considerable headway. It was the Canisteo's duty to know, before giving the signal, that she could make the turn, and, it appearing that after finding she could not make it she might have avoided the collision by reversing her engines, she was clearly in fault. It appearing that the Wales might also have avoided the collision without slacking her speed, by putting her helm hard a-starboard, thus giving more room, she too was negligent, and must bear half the damages."

Hall vs. the Lucy P. Miller is the title of a case decided a few weeks ago by Judge Brown of the United States district court, New York. A steamer aground in a dense fog in the East river near New York signaled for help, and a tug that went to her remained with her all night, most of the time pumping to keep down the water in her hold. In the morning when the fog lifted other tugs appeared on the scene and pulled the steamer off the bottom. After the claims for releasing the boat were settled the court decided that the service of the first tug was a salvage service and she was allowed a separate award of \$750, the boat in distress being valued with her cargo at \$38,000.

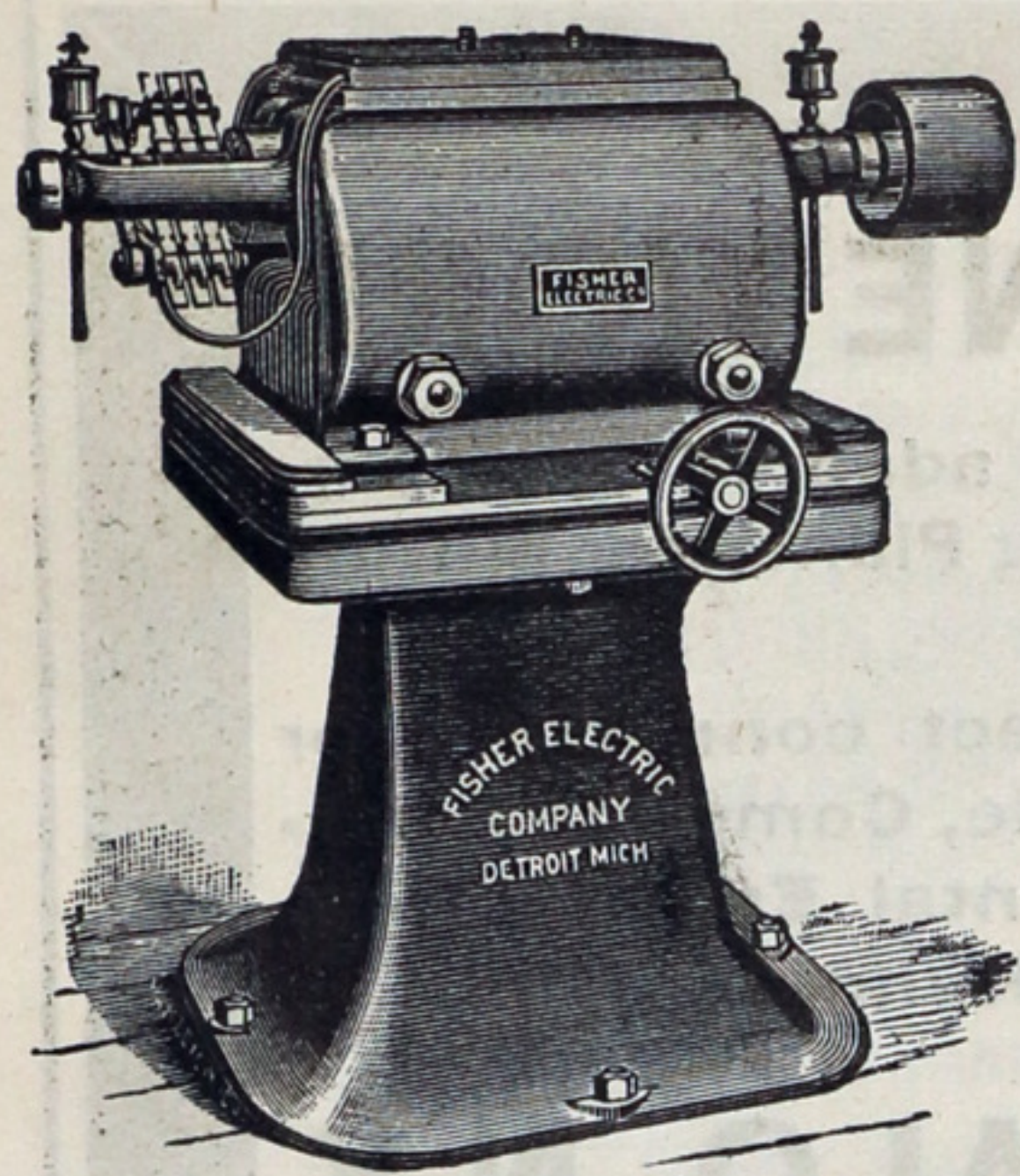
In all cases where exorbitant agreements are made under compulsion by the representatives of wrecking companies with vessel masters whose boats are in distress, the courts are disposed to discountenance the claims that follow. Another case is reported from the district court, California, in which the master of a wrecking tug demanded \$12,000 for releasing a vessel valued at \$89,000 and got but \$5,000. There was little difficulty in floating the stranded boat, but the agreement with the master was made at a time when there were indications of a heavy storm coming on and no other assistance could be secured.

Judge Simonton of the United States district court, South Carolina, heard a case a short time ago, in which he decided that a steamer meeting a sloop on a river at night, where there is ample room, must presume that the latter will maintain its course and must keep out of the way; and if she attempts to pass so near as to cause apparent danger of collision, she is solely in fault, although the sloop, under stress of excitement, commits an error suddenly changing its course.

"A Happy New Year to the Marine Public."

H. P. TOBEY,

Vessel and Mill Supplies, TOLEDO, O.



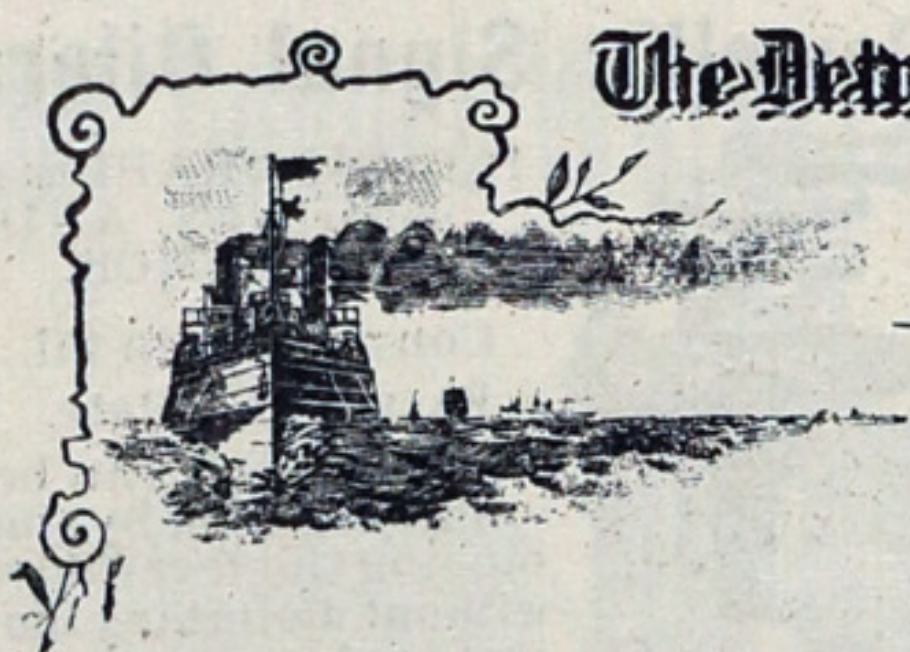
THE INCANDESCENT LIGHT

Is the only safe means of illuminating Passenger, Freight or Excursion Steamers. All other illuminants are dangerous. The Fisher system is Automatic in its operation, perfect in every detail, and does not require a skilled expert.

Hon. James McMillan, President.

Hugh McMillan, Vice Pres. & Treas.

D. Carter, Eng. & Genl. Manager.



The Detroit & Cleveland Steam Navigation Co.

Office of General Manager

Detroit, Mich. — Nov. 11th 1901

Fisher Electric Co.

Gentleman:-

It gives me great pleasure to state, that the two large Dynamos and the new Switch-Board and other new connections, placed in our Steamer City of Detroit, in place of the two, of another make, gives our boat people great pleasure and comfort; whereas the old-plant, on this Steamer, was always out of order and a large bill of expense for repairs and renewals. Your plant has practically cost us nothing since put in last May.

Yours Respectfully,

D. Carter

Genl. Mgr.

P.S. I might add, Chief Engineer Huff, of the above steamer says, that since you put in your Dynamos, and the general overhauling, you gave the plant, that it is now one of the "best plants on the Lakes"

LC

Another strong letter of indorsement for the Fisher system of lighting ships will occupy this space next week. These plants are on the best boats on the lakes, and steamboat officers recommend them with as much earnestness as owners.

FISHER ELECTRIC CO.

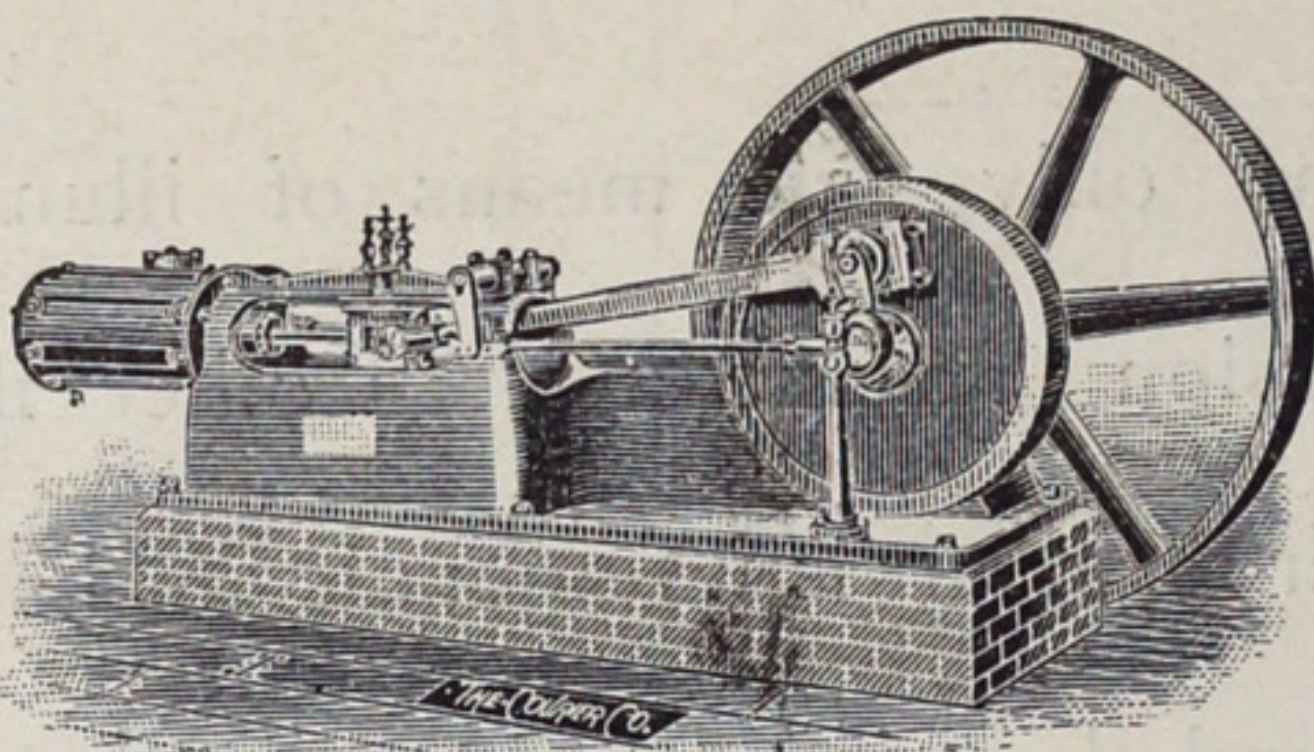
183, 185 & 187 Larned St., DETROIT, MICH.

(For engines operating these plants, see over.)

ELECTRIC LIGHT ENGINES for MARINE WORK

These are the Engines used with all the Electric Light Plants advertised on preceding page by **THE FISHER ELECTRIC CO.** of Detroit.

Over 25 lake boats fitted out between Jan. 1 and June 1, '91.



Especially adapted for operating Lighting Plants for Marine Work.

Either direct connection or by belt—Simple, Compound, Vertical. Horizontal Engines from Seven to Six Hundred H. P.

THE JNO. T. NOYE MFG. CO., BUFFALO, N.Y.

VESSEL AND MACHINERY EXCHANGE.

Space under this heading may be used gratis by our advertisers or subscribers to call attention to vessels or any craft, machinery, new or second hand, that they may have for sale. Those wanting machinery of any kind, or wishing to purchase vessels, are invited to take advantage of the same offer. Each item will be limited to three lines. Letters concerning same must mention number attached to item and be addressed **MARINE REVIEW, 510 Perry-Payne Building, Cleveland, O.**

- 82—FOR SALE—A1* steam barge; capacity 375M; easy terms.
- 83—FOR SALE—One compound marine engine cylinders 16 and 32x26 inches stroke.
- 84—FOR SALE—One return flue fire box marine boiler, 8 feet diameter, 12 feet long. New.
- 85—FOR SALE—8x4x10 Boiler feed pump.
- 86—FOR SALE—5 1/4 x 8x10 condenser.
- 87—FOR SALE—5 1/4 x 3 1/2 x 6 Boiler feed pump.
- 88—FOR SALE—Steambarge, A2 rating, and of 18,000 bushels grain, or 375,000 feet of lumber capacity. Will sell half or entire boat;
- 89—FOR SALE—Cheap, two 18x20 marine engines complete with out-board shafts, wheels, driving bearings, stern bearings, steam pipes and oil cups, all in good condition.
- 90—FOR SALE—Two Roberts Water Tube Safety Boilers 5 feet by 7 feet. In use about six months.
- 91—FOR SALE—Lumber schooner, B1 and carries 280 M.
- 9—FOR SALE CHEAP—Small ferry steamer.
- 93—WANTED—To trade, 2 or three fishing tugs for steambarge that will carry 200,000 to 400,000 lumber.

1867. PERFECT SATISFACTION GUARANTEED. 1891.

A. G. HARBAUGH & CO.,

34 & 36 River Street, CLEVELAND, O.

Manufacturers of Strictly Pure and Acidless Lard Oils, specially adapted for Steamboat use.

Will furnish Brand free for Ship Chandlers or other dealers who desire their name and address on packages.

H. G. TROUT, KING IRON WORKS,

BUFFALO, N. Y.,

MANUFACTURERS OF
TRIPLE EXPANSION,
THREE CYLINDER,
FORE AND AFT

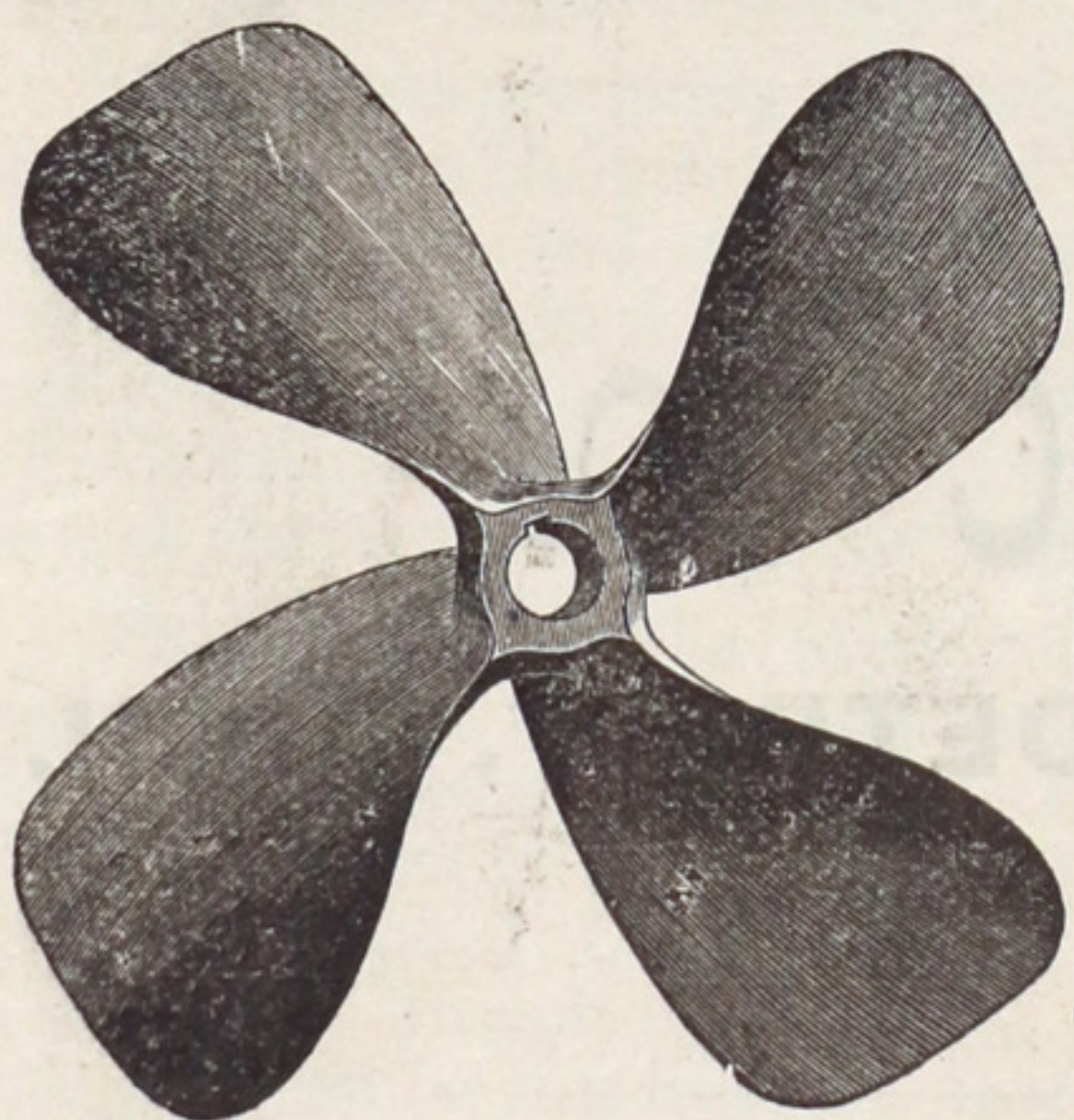
And STEEPLE COMPOUND
MARINE ENGINES,

High and Low Pressure Engines,
Sectional, Propeller,
Tug and Yacht Wheels.

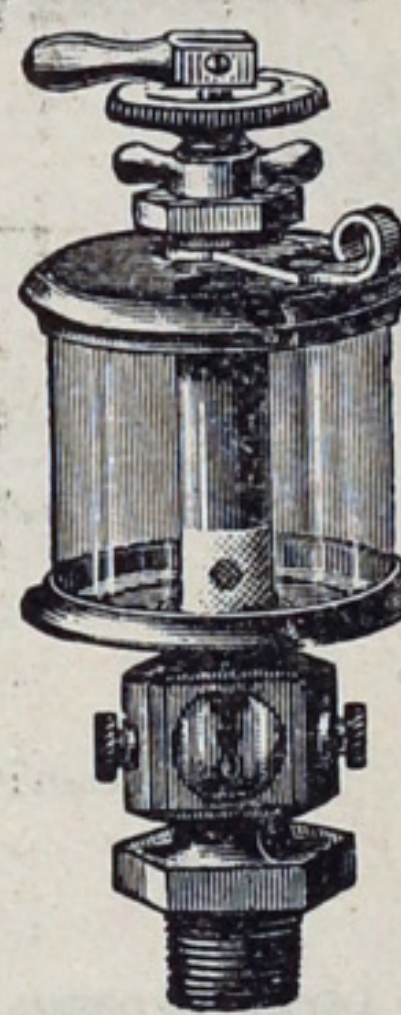
Cowles Aluminum and Manganese
Bronze Propeller Wheels.

These Wheels are noted for their extra speed, towing power and proportionate saving of coal.

PRICES QUOTED ON APPLICATION.



Powell's Signal Oilers.



INCOMPARABLE FOR ENGINES AND DYNAMOS.

Convenient to fill.
Easy to regulate.

Flow of oil can be instantly shut off by simply moving the lever down—without disturbing the adjustment.

Also made Double and Triple Sight feed for Marine Engines.

Your dealer can supply you. Manufactured by

The Wm. Powell Co.,
CINCINNATI, O.

B. W. PAYNE & SONS, Elmira, N. Y.
45 Day St., New York City.

FOR YACHTS.
Our Patent Boiler will give dry steam; will carry a steady water-line; will raise **One Hundred** pounds of steam in one-half the time ordinary boilers require. See what experts say: "Perfect circulation and dry steam."—*Prof. R. I. Thurston*. "Would not do without your improvement in a boat boiler."—*Herman Westinghouse*.
A Working Glass Model may be seen at

POPULAR and INSTRUCTIVE BOOKS

For Engineers and Firemen,

—BY—

STEPHEN ROPER, Engineer.

ROPER'S HAND BOOKS.

Hand-Book of Land and Marine Engines.....	\$3 50
Engineers' Handy Book.....	3 50
Hand-Book of Modern Steam Fire Engines.....	3 50
Hand-Book of the Locomotive.....	2 50
Instructions and Suggestions for Engineers and Firemen.....	2 00
Use and Abuse of the Steam Boiler.....	2 00
Catechism of High Pressure Steam Engines.....	2 00
Questions and Answers for Engineers.....	3 00
Simple Process.....	50
Care and Management of the Steam Boiler.....	2 00
Young Engineers' Own Book.....	3 00

These books embrace all branches of Steam Engineering—Marine, Stationary, Locomotive and Fire. Any engineer who wishes to be well informed in all the duties of his calling should provide himself with a full set. They are the only books of the kind ever published in this country, and they are so plain that any engineer or fireman that can read, can easily understand them.

Any of the above books will be sent to any part of the United States or Canada on receipt of list price.

Send money in Registered Letter, P. O. Order or Postal Note.

EDWARD MEEKS, Publisher,

No. 1012 Walnut St., PHILADELPHIA, PA.

WRECKING AND TOWING COMPANIES.

I. H. OWEN, PRESIDENT, F. H. VAN CLEVE, SEC. CAPT. GEO. BARTLEY, SUPT.
Chicago. Escanaba. Escanaba.

ESCANABA TOWING & WRECKING CO., Escanaba, Mich.

Tugs, Lighters, Steam Pumps, Hawsers, Hydraulic Jacks and Diving Appliances always ready.

TUG MONARCH, Engine Compound, Cylinder 16 and 30 inches diameter, 30 inch Stroke, Steam Pressure Allowed, 125 pounds.

TUG DELTA, Cylinder 20 by 22, Steam Pressure Allowed, 105 pounds.

TUG OWEN, Cylinder 20 by 20, Steam Pressure Allowed, 104 pounds.

CENTRIFUGAL PUMPS, Seven and Fourteen Inch Suction.

V.O.T. LINE OF TUGS.

ALVA B.

H. L. CHAMBERLIN.

W. D. CUSHING.

JOE HARRIS.

TOM MAYTHAM.

C. G. CURTISS.

W. A. COLLIER, Manager.

Office, Main Street Bridge,
Telephone 409.

CLEVELAND.

Steam Pumps, Hawsers, Lighters, etc., furnished on short notice.

ERIE OIL COMPANY,

HIGH FLASH.

ERIE, PA.,

HIGH VISCOSITY.

MANUFACTURERS OF THE
Monarch Valve Cylinder and Engineers Valve Oils,

THE MOST PERFECT CYLINDER OILS FOR MARINE USE.
EVERY BARREL GUARANTEED.

Send 75 cents to the MARINE REVIEW for a Binder that will hold 25 numbers.

S. B. GRIMMOND,
FIRST CLASS TUGS FOR WRECKING, RAFT TOWING, ETC.,

OWNER OF TUGS

WINSLOW
LEVIATHAN, SWEEPSTAKES
CRUSADER, M. SWAIN
CHAMPION, JOHN OWEN
WM A. MOORE &
OSWEGO.



EIGHTEEN
STEAM PUMPS,
ROTARY WORTHINGTON &
CENTRIFUGAL HYDRAULIC JACKS,
SUB MARINE DIVERS, HAWSERS,
LIGHTERS & C.
WAREHOUSE & OFFICE ON
DOCK, FOOT OF
FIRST ST.

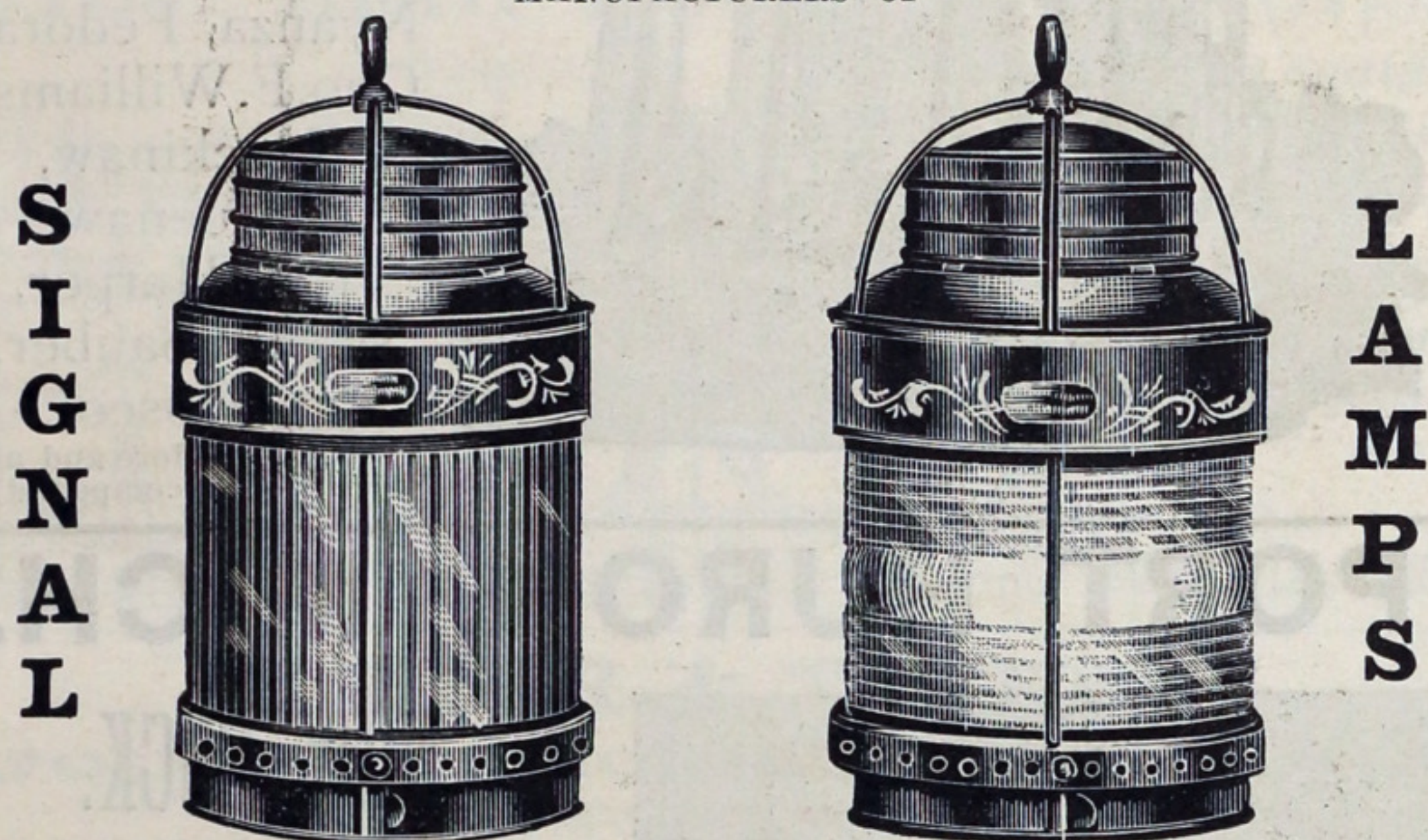
OFFICE OPEN DAY & NIGHT
SATISFACTION GUARANTEED.
DETROIT, MICH.

WRECKING TUG LEVIATHAN STATIONED AT CHEBOYGAN
WITH PLENTY OF WRECKING MATERIAL ON BOARD AND IN WAREHOUSE.

BRANCH OFFICES AT PORT HURON, & CHEBOYGAN MICH

McBEAN, EDGE & CO.,
Steamboat Sheet Iron, Tin and Copper Workers,

— MANUFACTURERS OF —



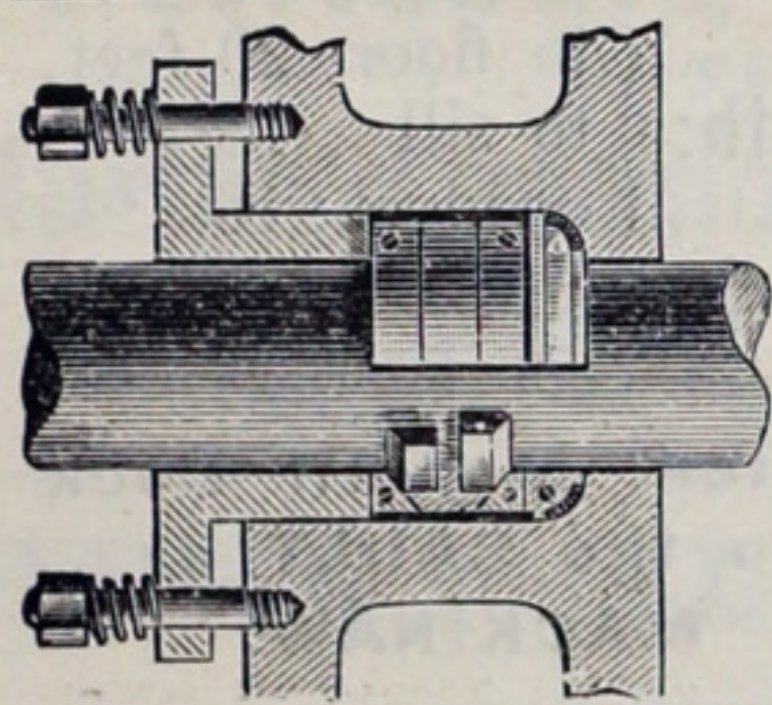
With patent lenses, fluted or corrugated, with corrugations inside or out.
STEEL RANGES for Steamboats and Hotels.

HEAD LIGHTS, ENGINEERS' SUPPLIES,

Anchor and Binnacle Lamps; Square, Triangle and Canalboat Head-Lights; Torches,
Coal Oil Lamps, Lanterns, Chimneys, Wicks, &c.

Telephone 803.

33 Main St., BUFFALO, N.Y.



Forrest's Silver Bronze Packing.

Applied to any stuffing box, without disconnecting. Steam, air and water tight without soft packing, under the highest steam pressure and piston velocity, non-corrosive, automatic, cannot get out of order, admits of excessive vibrations of rods, does not bind, economical, satisfactory, guaranteed to last 2 to 10 years with no attention. Will pack engines by the year. Used on the best steamers in New York Harbor. References.

115 Liberty Street, New York.

B. D. BABCOCK, President.

W. E. LUDLOW, Vice-Pres. & Gen. Mgr.

W. R. HUNTINGTON, Sec'y & Treas.

THE LUDLOW MANUFACTURING CO.

Office, 121 Superior St., Room 12, CLEVELAND, OHIO,

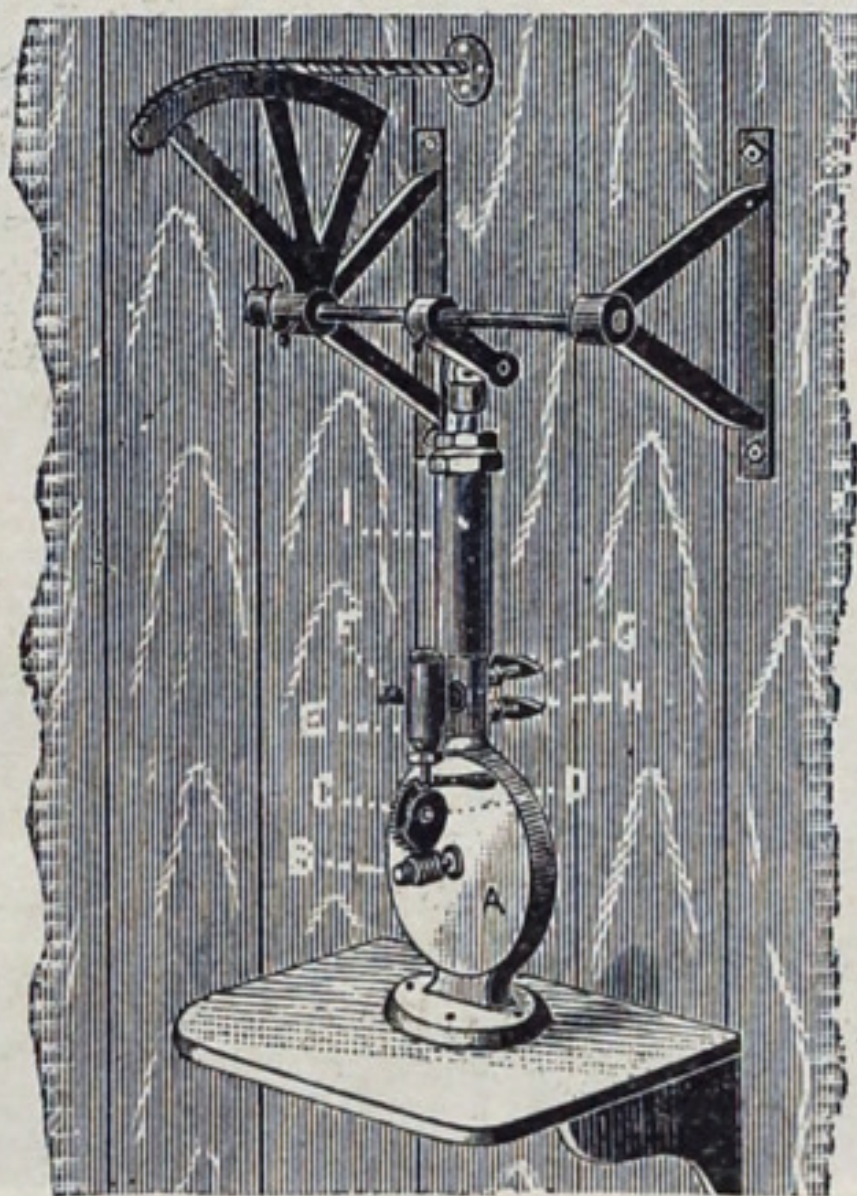
MANUFACTURERS OF

The Ludlow Bucket,
FOR THE HANDLING OF
COAL, ORE and STONE.

CLEVELAND, O., Nov. 18, 1891.

TO WHOM IT MAY CONCERN:—We have had four of the one and one-half ton and four of the two-ton Ludlow Buckets in use on our coal docks since July 5, 1891, and have had no repairs whatever to make on them, with the exception of replacing one defective stem. The Buckets do the work to our entire satisfaction, and when used in connection with the Ludlow Patent Trip, which has been in use on one of our derricks for the past six weeks, they are, in our opinion, away ahead of any other coal buckets we have ever seen used.

J. S. ASHLEY, Agent,
New York and Cleveland Gas Coal Co.



RYMER'S
Code and Fog Whistle Operator

Can be placed on a bracket in pilot house.
Operation as a fog whistle does not interfere
with its use as a code signal.

WM. RYMER,

Agent and Manufacturer,

395 Champlain St., DETROIT, MICH.

Correspondence Solicited.

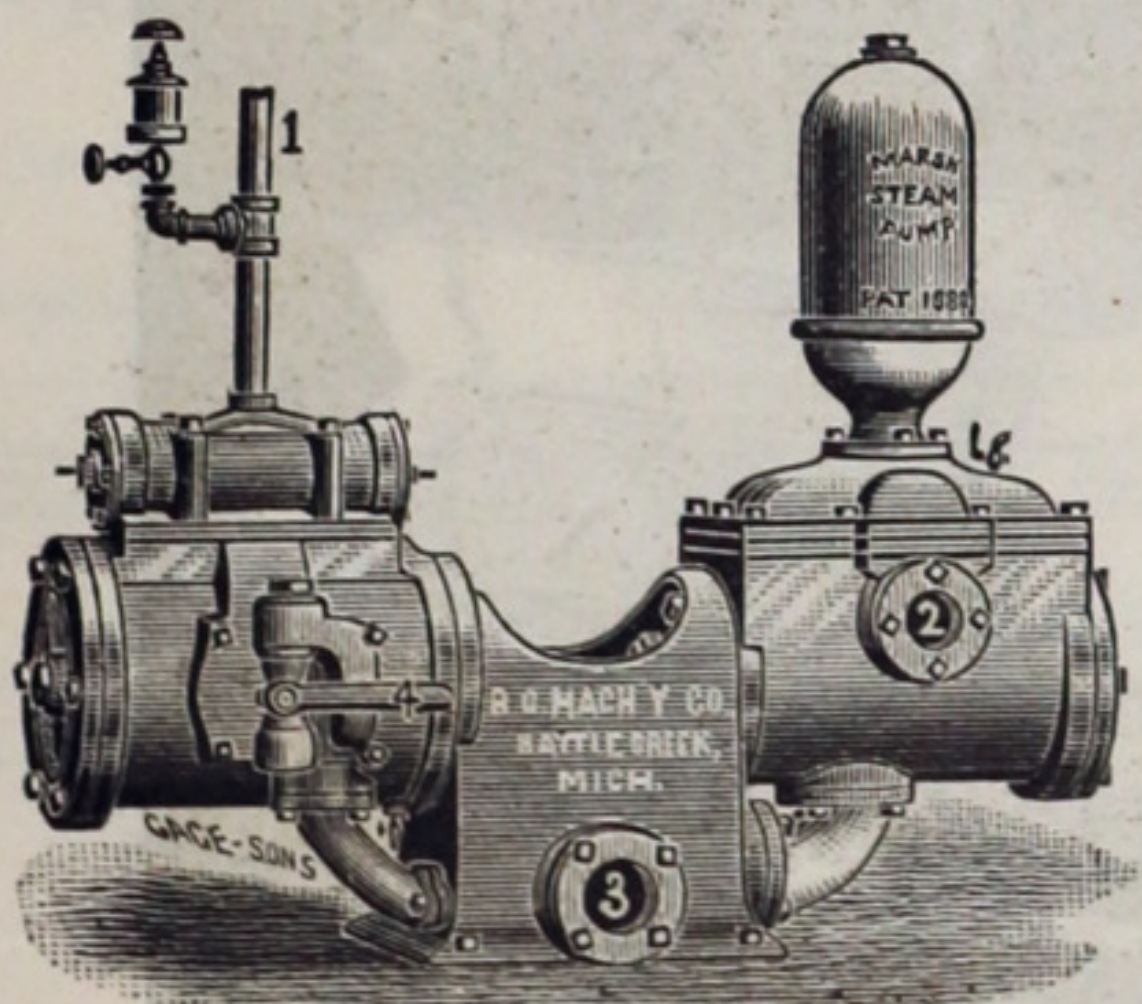
FUEL

O. S. RICHARDSON FUELING CO.

CHICAGO

Foot of North Market Street.
DOCKS: West Side Illinois Central Slip "C,"
and 18th Street Bridge.

Steam Derricks and all Modern Appliances for Rapid Coaling.



MARSH STEAM PUMP,

Absolute Actuation and Regulation Without Use of Tappets,
Levers or other Mechanical Connections.

FOR MARINE AND STATIONARY BOILERS.

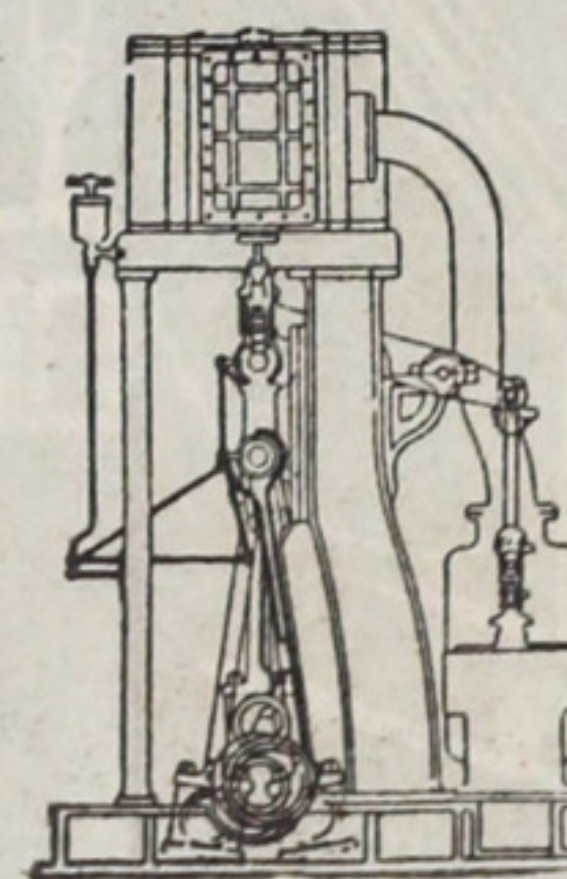
Smaller Sizes With or Without Hand Pumping Attachment.

Exhaust Returned to Boiler. Heats Feed Water Forty to Fifty Degrees, according to tests made by Prof. M. E. Cooley, of the University of Michigan.
Steam Valves Actuated by Direct Boiler Pressure.

Has Fewer Wearing Parts than ANY OTHER Steam Pump.

For Circulars and Prices, address
STRONG, CARLISLE & TURNER, Cleveland, O. STANNARD & DILLON, Chicago, Ill.
DETROIT SHEET METAL & BRASS WORKS, Detroit, Mich. H. P. TOBEY, Toledo, O.
SMALLEY BROS. & CO., Bay City, Mich. CARLETON & COLE, Port Huron, Mich.
or BATTLE CREEK MACHINERY CO., Manufacturers, Battle Creek, Mich.

THE O'CONNELL GREASER,



During the past three years hundreds of marine engines of from 2,000 to 4,000 h. p. have been served, as well as high speed electric light engines.

RESULTS:

Sure control of Crank Pin.
Stoppage of Lard Oil account.
Perfectly clean Engine
O'Connell & Cahill,
Manistee, Mich.
Dark lines indicate apparatus.

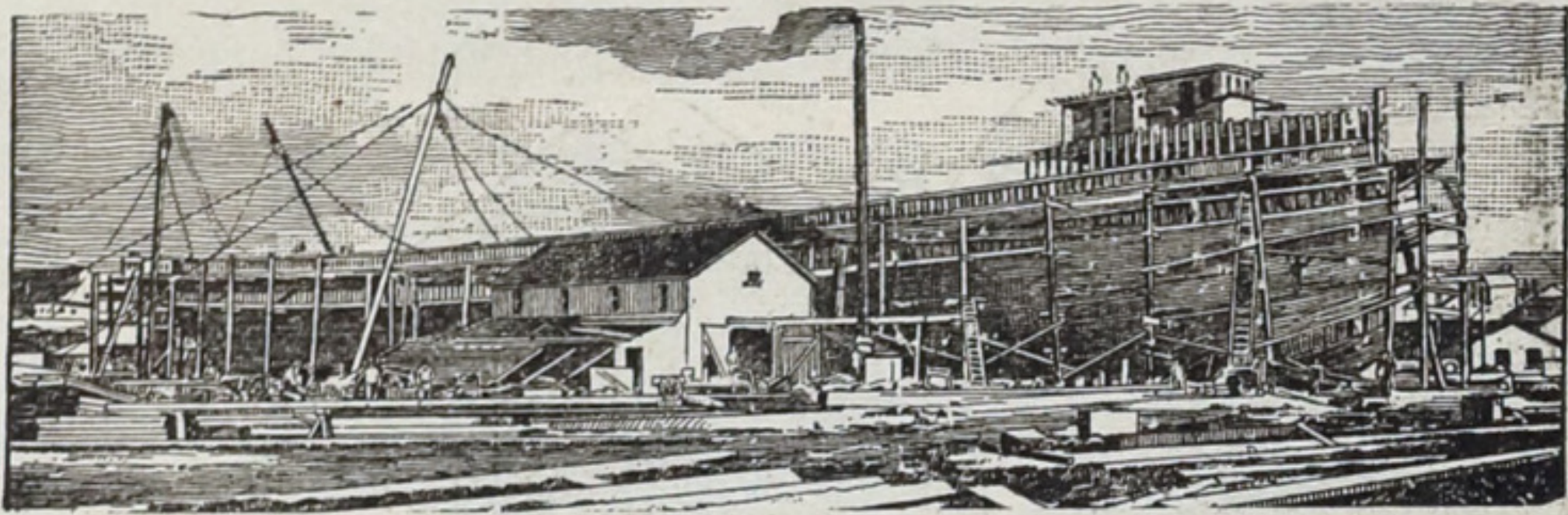
CON. STARKE.

JOS. WOLTER.

AUG. RIEBOLDT.

RIEBOLDT, WOLTER & CO.,

SHIPBUILDERS,



SHEBOYGAN, WIS.

FLOATING DRY DOCK WILL LIFT VESSELS OF 400 TONS.

H. D. ROOT, Lorain, O.

Established 1853.

SHIPBUILDING AND GENERAL REPAIRING.

TUGS AND STEAM YACHTS A SPECIALTY.

J. D. WILSON.

M. HENDRIE.

Montague Iron Works,

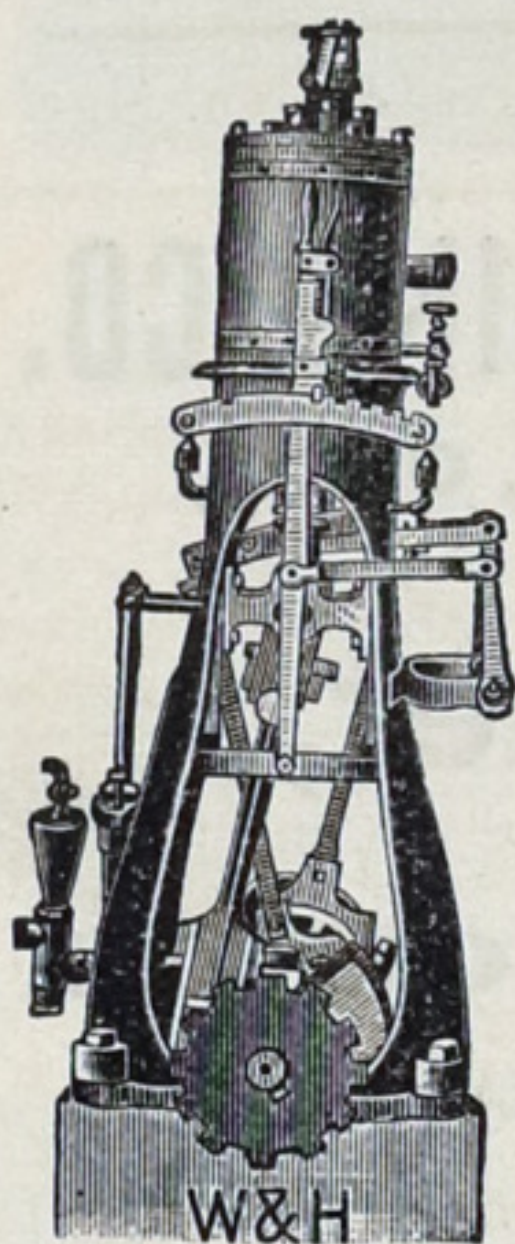
MONTAGUE, MICH.

WILSON & HENDRIE, Proprietors.

MANUFACTURERS OF

Marine Engines and Boilers,

AND GENERAL MILL MACHINERY.



HENRY B. BURGER.

GEORGE B. BURGER.

H. B. & G. B. BURGER,

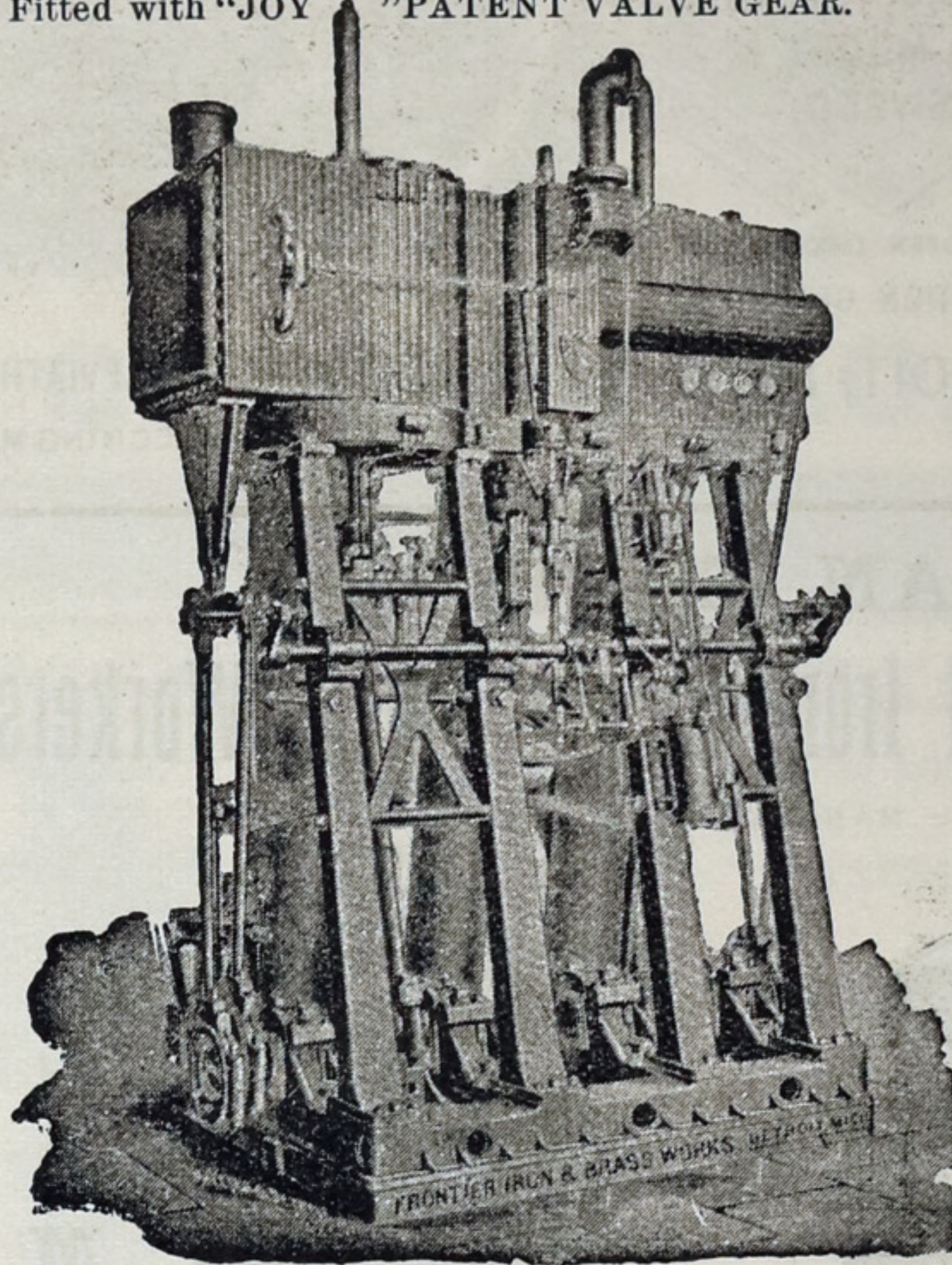
MANITOWOC, WIS.

Ship Builders and Contractors.

Dock will admit vessels of 1200 tons and boxes will lift 350 ton vessels. Yard is fitted with a large spar derrick, and a stock of spars always on hand.

THE FRONTIER IRON WORKS,

Fitted with "JOY" "PATENT VALVE GEAR.



DETROIT, MICH.

Builders of

TRIPLE EXPANSION

and all kinds of

Marine Engines

Engines furnished for Steamships:

T. W. Palmer,

Livingstone,

Majestic, Tampa,

John Mitchell,

Nyanza, Fedora,

Geo. F. Williams,

Mackinaw,

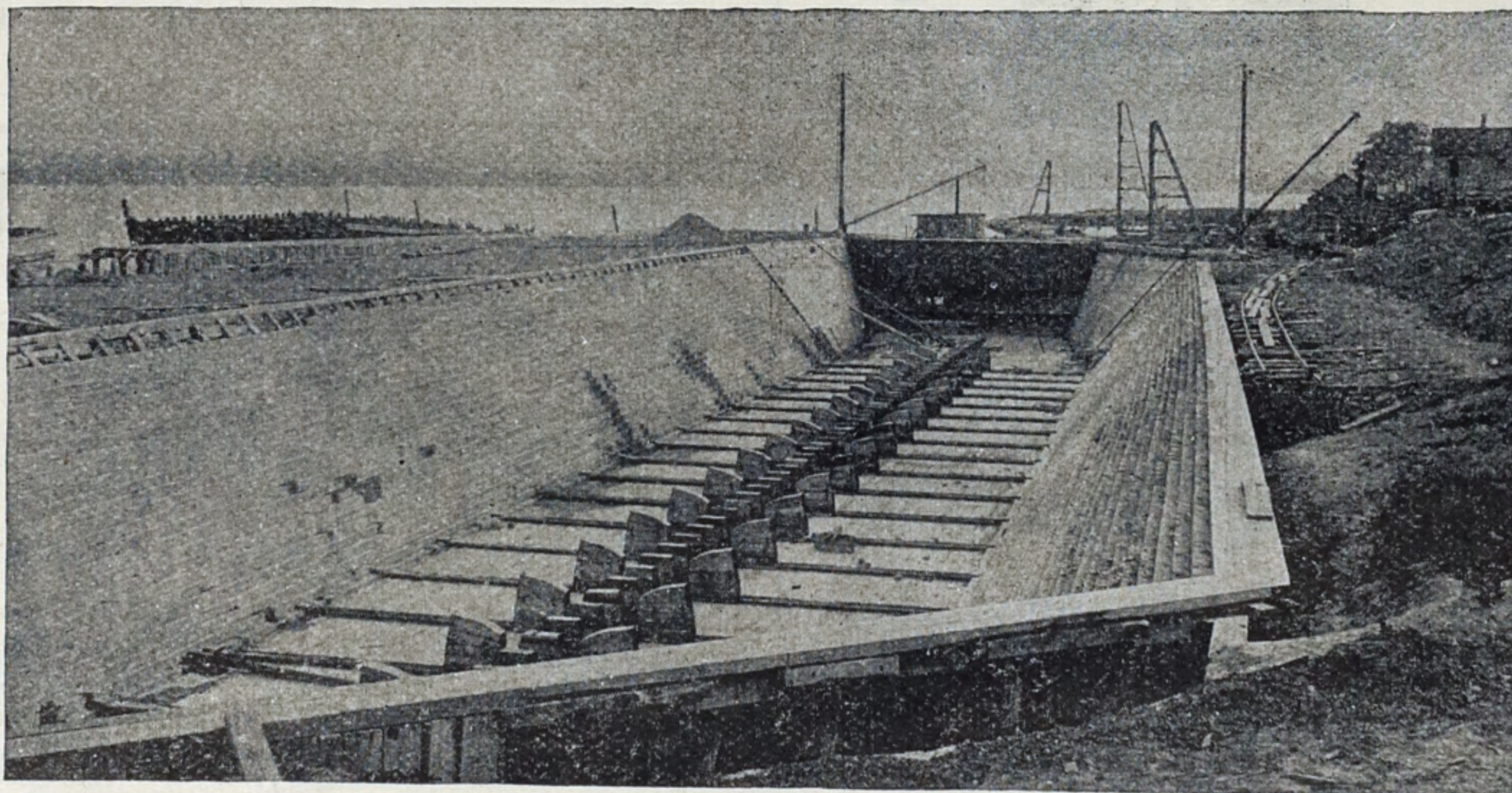
Keweenaw,

Jno. Harper,

W. F. Sauber,

and Iosco.

Panther, (fore and aft compound)

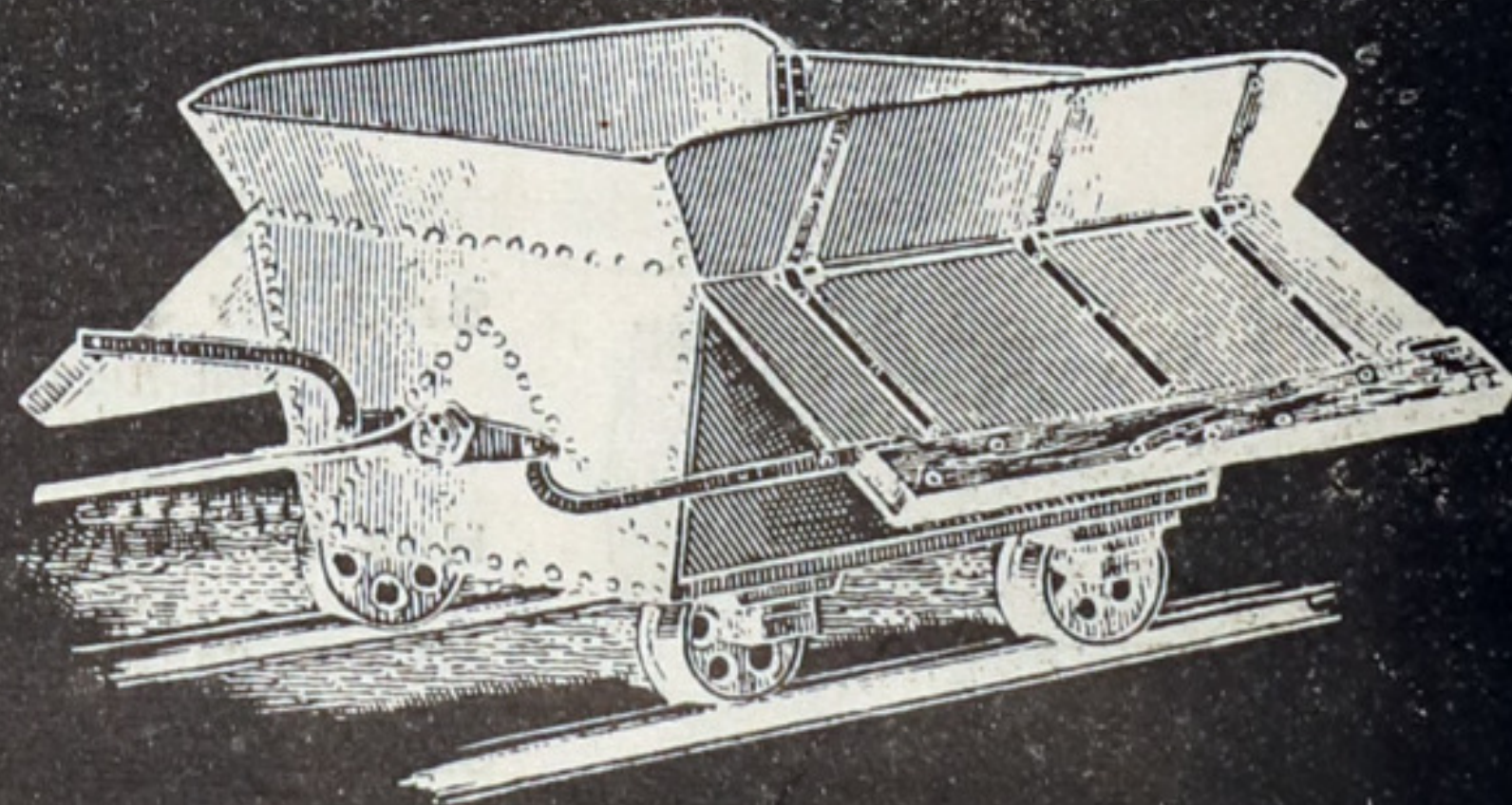
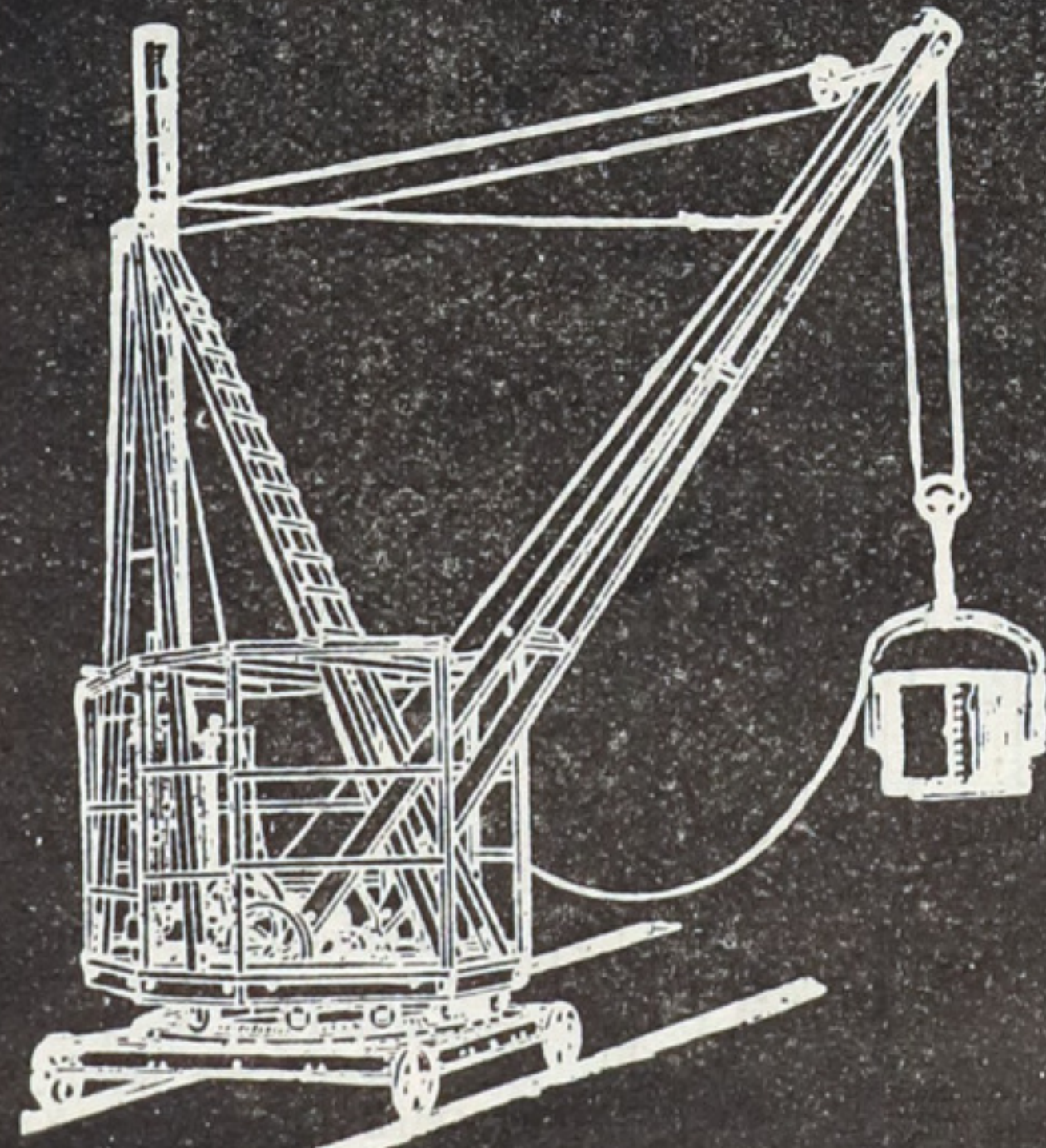
DUNFORD & ALVERSON, PORT HURON, MICH.**SHIP BUILDING.**DOCKING,
REPAIRING,
SPAR MAKING.DOCK HAS PIT TO
SHIP RUDDERS.**NEW DOCK.**

(Largest on the Lakes.)

Length: 400 feet.

Width: { on top 95 feet.
bottom 55 "
at gate 62 "Depth: { to floor 20 feet.
to sill 18 "
on blocks 16 "Nearest Modern Dock
to the SAULT or
MACKINAW.**McMYLER MANUFACTURING CO., 180 COLUMBUS STREET, CLEVELAND, O.**

— SOLE MAKERS OF THE —

McMYLER PATENT REVOLVING STEAM DERRICKFOR HANDLING COAL, ORE AND COARSE FREIGHT
OF ANY DESCRIPTION.This Derrick can Lift Load, Alter the
Radius of Boom, Swing in Either
Direction at Will of Operator, and
can Propel Itself on Track any De-
sired Distance.**BUILT FOR ANY CAPACITY WANTED****BUILDERS OF
CONVEYORS, COAL BUCKETS, ORE
BUCKETS AND DUMP CARS.**

SWAIN WRECKING CO.TUGS FAVORITE
and SAGINAW.TELEGRAPH
PARKER & MILLEN, DETROIT, MICH.
Capt. M. SWAIN, CHEBOYGAN, MICH.**REASONS**

Why You Should Buy

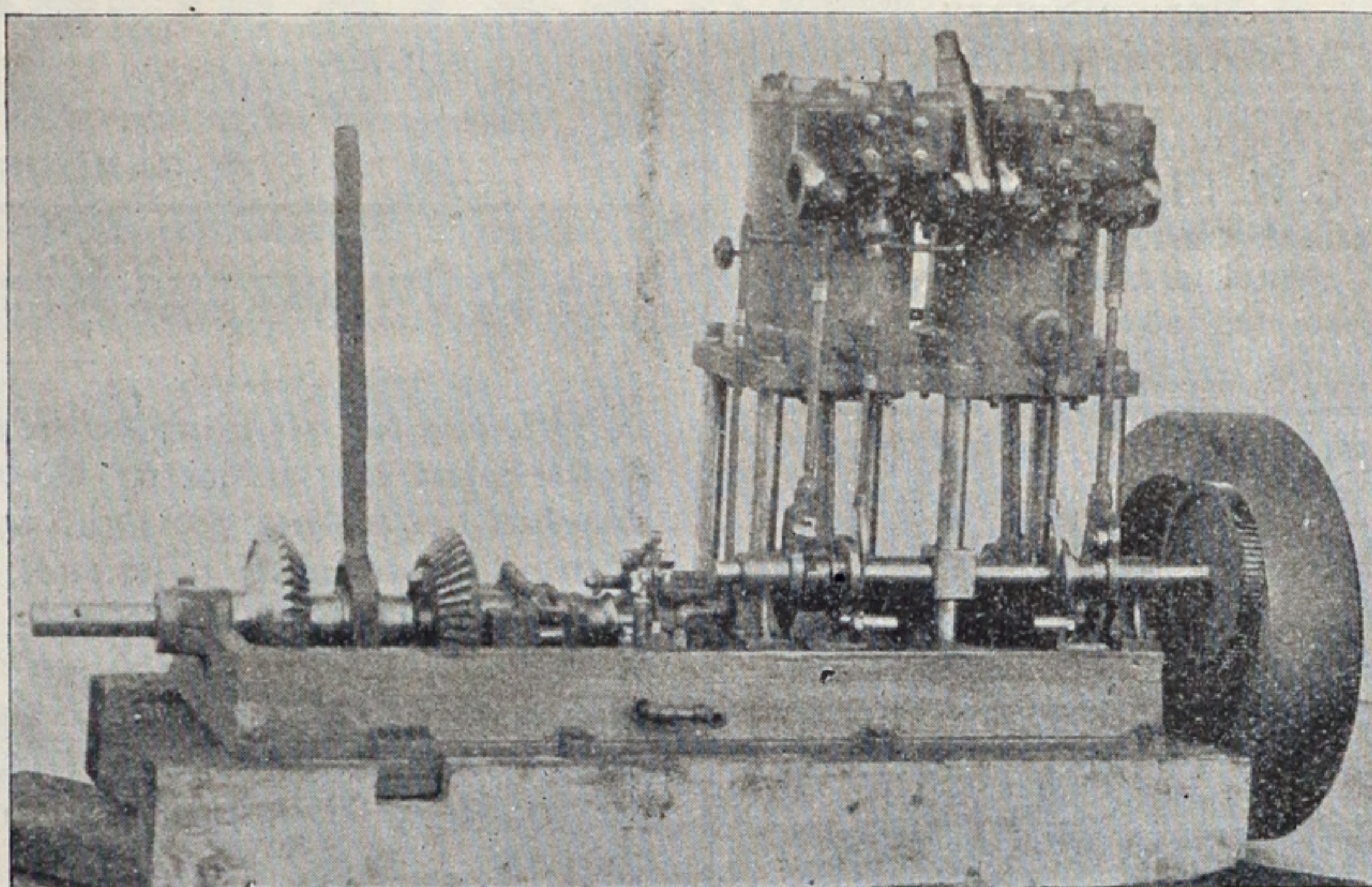
THE SINTZ ENGINE.

It gives more actual power for the cost and the expense of running it than any other engine on the market, using but one gallon gasoline per horse power in ten hours.

It occupies less space per horse power.

It requires no boiler, coal, wood or fireman, inspection or licensed engineer.

Can be used in the country, in mines, and such places independent of manufactured gases.



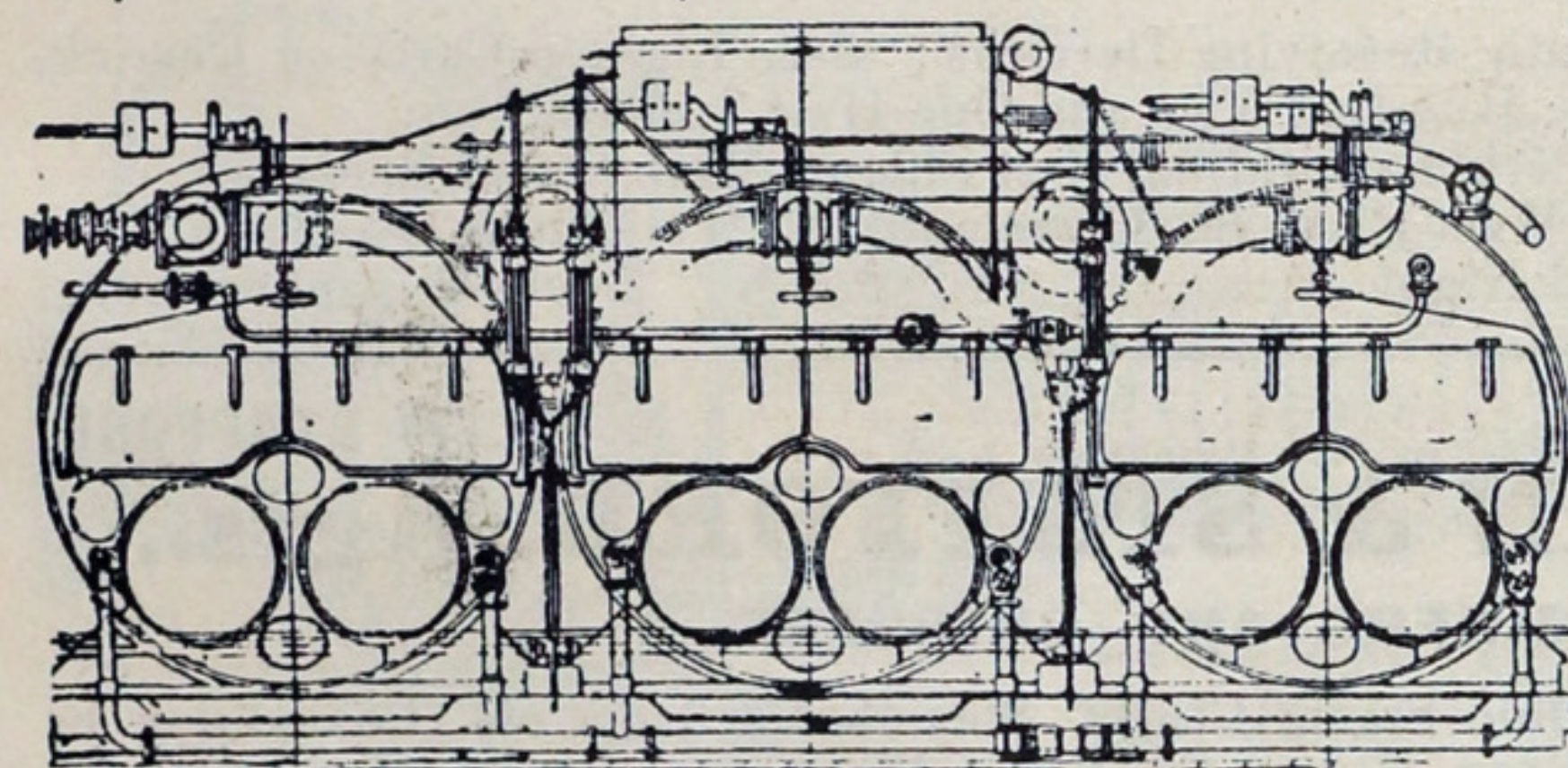
PRICES F. O. B. SPRINGFIELD.

Horse Power.	Revolutions Per Min.	Driving Pulley.		FLOOR SPACE	PRICE.	
		Diam.	Face.		Stationary.	Marine.
1	350	6 in.	4 in.	1ft 9in x 2ft 6in	\$200 00	\$275 00
2	320	9 in.	6 in.	2ft 6in x 2ft 6in	275 00	300 00
4	320	12 in.	6 in.	2ft 9in x 2ft 9in	380 00	410 00
6	320	15 in.	8 in.	2ft 6in x 3ft 6in	485 00	520 00

MANUFACTURED BY
CLARK SINTZ,
SPRINGFIELD, OHIO.

LAKE ERIE BOILER WORKS.

The Best Equipped plant in America for the manufacture of modern Marine Boilers.

—O—
BUFFALO, N. Y.

FARRAR & TREFTS,
Propeller, Yacht & Tug Wheels,
MARINE AND STATIONARY
ENGINES AND BOILERS.

REPAIRING PROMPTLY ATTENDED TO.
54 to 66 Perry Street, Buffalo, N. Y. Drilling Boilers and Engines a Specialty

JOHNSTON BROTHERS,
Ferrysburg Steam Boiler Works,
FERRYSBURG, MICH.
Marine, Locomotive and Stationary Boilers,
Tanks and Sheet Iron Work.

REPAIRS PROMPTLY ATTENDED TO.

HENRY BLOECKER & COMP'Y,

—MANUFACTURERS OF—

ALL CLASSES OF **Marine Engines.**
General Job and Repair Work promptly attended to.
GRAND HAVEN, - - MICH.

C. H. McCUTCHEON,

(Successor to SAMUEL McCUTCHEON.)

Copper, Tin and Sheet Iron Manufactory,
Steamboat and Engineers' Supplies.

All kinds of Brass Cocks, Globe Valves and Couplings, &c. Iron Pipe and Fittings, and Mill Supplies. Rubber Belting, Hose and Packings, Springs, Valves, &c., Leather Belting and Usudurian Packing.

Telephone No. 68. No. 18 Ohio Street BUFFALO, N. Y.

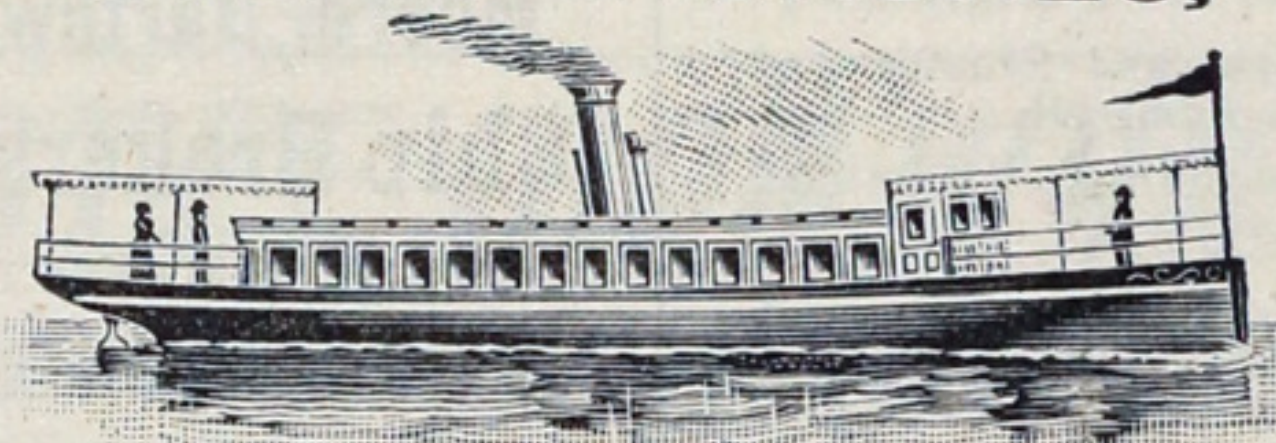
ERIE RUBBER CO.,

ERIE, PA.,

—MANUFACTURERS OF THE—

KEYSTONE MARINE VALVE.

*These RED, AIR AND FOOT VALVES, are the
Best Rubber Valves made.*

STEAM LAUNCHES,**STEAM YACHTS & TOW BOATS,**

HIGH SPEED MARINE ENGINES All types of boat boilers, including the ROBERTS WATER TUBE SAFETY BOILER with our improvements. CHAS. P. WILLARD & CO., Catalogue free. 5 Dominick St., Chicago.

THE GRAND HAVEN SHIPBUILDING CO.,

D. ROBERTSON, Manager and Builder.

SHIPBUILDING, REBUILDING, REPAIRING,
TUGS, FISHING BOATS, YACHTS.

PHOENIX IRON WORKS

—MANUFACTURERS OF—

Modern Marine Engines AND Boilers

1223 to 1231 Fourth St., PORT HURON, MICH.

Telephone Nos. { Office, 15. Special Attention Given to Repairs.
Residence, 192.

— HAVE YOU HEARD OF THE —
HYDRAULIC STEERING GEARS.

IT IS ASTONISHING HOW WELL AND EASY THEY DO THEIR WORK.
Manufactured by

CRAWLEY & JOHNSTON,

CORRESPONDENCE SOLICITED.

CINCINNATI, OHIO.

DULUTH DIRECTORY.**THE CLYDE IRON COMPANY,**

OFFICE AND WORKS: 302, 304, 306 & 308 Lake Avenue, South, DULUTH, MINN.

R. A. WEBSTER, Supt.

Machinists, Foundrymen, Blacksmiths and Steam Fitters. Special attention given Marine Work. Ship Chandlery & Mill Supplies, Packings, Waste, Oils, Greases, Boiler Purgers, etc.

CHICAGO PHOTO-GRVURE CO.

358 DEARBORN ST., CHICAGO, ILL.

COMMERCIAL WORK, BOOK ILLUSTRATIONS and ART REPRODUCTIONS.

Photo-Gravures for Advertising Purposes.

Represented by **LOUIS SCHERZINGER**, Room 27, Kendall Block, 106 Euclid Ave.
CLEVELAND, OHIO.

BUFFALO DIRECTORY.**EDWARD C. GREENOUGH.****PHILIP TUMMELTY.****QUEEN CITY METAL COMPANY,**

Machine Shop and Brass Foundry, Copper and Sheet-Iron Work and General Repairing, and Engineers' Supplies.
Nos. 16, 18 & 20 ELK ST. BUFFALO, N. Y.

CLEVELAND BOOK BINDERY,
196 Seneca St., CLEVELAND, O.

BLANK BOOKS

In Stock and Made to Order.

BINDING

Magazines and Periodicals a Specialty.

T. G. Crosby, C. A. Macdonald,
J. J. Rardon.

CROSBY, MACDONALD & CO.

General Insurance Agents,

RIALTO BUILDING, CHICAGO, ILL

JOHN C. FITZPATRICK.

JOHN MITCHELL.

JOHN F. WEDOW.

MITCHELL & CO.,

Vessel and Insurance Agents,

508-509 Perry-Payne Building,

CLEVELAND, OHIO.

Office Telephone, 737.

Residence, John Mitchell, 3506.

J. C. Fitzpatrick, 2305.

White, Johnson & McCaslin,
ATTORNEYS-AT-LAW,

—AND—

Proctors in Admiralty,

26-27 Blackstone Building,
CLEVELAND, - OHIO.

JOSIAH COOK, ATTORNEY,
And Counselor at Law and Proctor and
Advocate in Admiralty.

Office, Nos. 12, & 14 Spaulding's Exchange,
BUFFALO, N. Y.

Special attention given to all U. S. court
and admiralty business in all its branches
and the collection of Seamen's wages.

THOS. WILSON,

MANAGING OWNER

WILSON'S TRANSIT LINE.

Gen. Forwarder.

Freight and Vessel Agent.

CLEVELAND, O.

WARNER & CO.,

Vessel Agents and Brokers,

Nos. 511 & 512 Perry-Payne Building,

Superior Street, CLEVELAND, O.

C. F. Palmer. Chas. Hutchinson.
P. J. Minch.

PALMER & CO.,

Vessel Owners and Agents,

(John H. Palmer and John T. Hutch-
inson, Associates.)

Perry-Payne Bldg., Cleveland, O.

FOR SALE AT A BARGAIN,

Two Roberts Water Tube Safety Boilers

5 ft. x 7 ft.; in use about six months on
Sand Barge "Laura D." One has new
tested steel dome. Enquire of

CAPT. C. G. GILLESPIE,

417 Water St., TOLEDO, O.

W. W. Widdowson

ATTORNEY-AT-LAW AND
PROCTOR IN ADMIRALTY

Marine Notary.

ASHLAND, WIS.

C. W. ELPHICKE.

A. L. FITCH.

JAS. A. MYERS.

C. W. ELPHICKE & CO.,

Vessel Owners and Agents,
Marine Underwriters,

Rooms 10, 11 and 12, 6 and 8 Sherman St.
WHEELER BLOCK. CHICAGO.
Telephone 1194.

FUELING COMPANIES.
THE SANDUSKY COAL COMPANY,
MINERS AND SHIPPERS OF
THE GENUINE JACKSON HILL AND WELLSTON SHAFT
COAL.

Office with R. B. Hubbard & Son. Telephone 32. Boats Coaled Night or Day.
Dock Office and Derrick, Big Four (C.C.C. & St. L. R'y). Electric Light.
Dock Telephone 163. SEND FOR OUR POCKET SLATE. Night Telephone 318.

SANDUSKY, OHIO.

To Owners and Masters of Steam Barges.

We beg to call your attention to the fact that we have steam lighters at the ports of Cleveland, Ashtabula and Buffalo, specially equipped for fueling vessels, which enable us to run alongside steamers and fuel them while they are unloading during day or night time. We also have fueling docks at the above ports, at which we can take care of vessels not desiring to avail themselves of the services of the steam lighters. We shall in the future, as in the past, handle nothing but the best grade of Pittsburg coal, and respectfully solicit your patronage.

PICKANDS, MATHER & CO.

THE CUDDY-MULLEN COAL CO.,
Dealers in COAL.

Docks at Government Pier, Whiskey Island, and Ad-
joining Globe Dry Dock.

All fully equipped with Revolving Derricks; also, Lighter Carrying Derrick,
and One Hundred Two and One-Half Ton Buckets.

Main Office, 81 Perkins Building, East Side of Main Street Bridge.

Dock Office, 127 West River St., Cleveland, O. Telephone No. 8.

Boats Coaled Day and Night.

Docks at Amherstburg.

N. J. BOYLAN.

B. F. STAFFORD.

BOYLAN & STAFFORD, Agts.,

MINERS AND SHIPPERS,

Youghiogeny and Ohio Steam Coals. Steamboats, Tugs, etc., Coaled day or
night, DOCKS FOOT WEST RIVER STREET. WHISKEY ISLAND GOVERNMENT
PIER and C. & P. R. R. SLIPS. Also STEAM LIGHTER—Equipped with
Revolving Derrick and (100) two ton buckets.

Telephone 1608. Office, 130 West River St., CLEVELAND, OHIO.

SIMPSON & MORRISON, Compass Adjusters,
and manufacturers of

All Nautical Instruments carefully repaired. NAUTICAL INSTRUMENTS.

Office with UPSON, WALTON & Co., 161 River St., CLEVELAND, OHIO.

ADVERTISING.

If you wish to advertise anything anywhere at any time, write to GEO. P. ROWELL
& CO., No. 10 Spruce St., New York.

EVERY one in need of information on the subject of advertising will do well to obtain
a copy of "Book for Advertisers." 368 pages, price one dollar. Mailed, postage
paid, on receipt of price. Contains a careful compilation from the American Newspaper
Directory of all the best papers and class journals; gives the circulation rating of every
one, and a good deal of information about rates and other matters pertaining to the busi-
ness of advertising. Address ROWELL'S ADVERTISING BUREAU, 10 Spruce St., N.Y.

MILWAUKEE BOILER COMPANY,

[Successor to R. Davis Marine Boiler Works.]

Manufacturers of Marine and Stationary Boilers, Smoke Stacks, Tanks, Etc.

MARINE REPAIRING | Open Day | OFFICE AND SHOPS,
SPECIALLY ATTENDED TO. | & Night. | OREGON BET. BARCLAY & So. WATER STS.

T. L. McGREOR, Supt.

MILWAUKEE, WIS.

Telephone 742.

T. S. & J. D. NECUS

Have the largest and finest stock of Nautical In-
struments and Charts in the United States.

Estimates given for

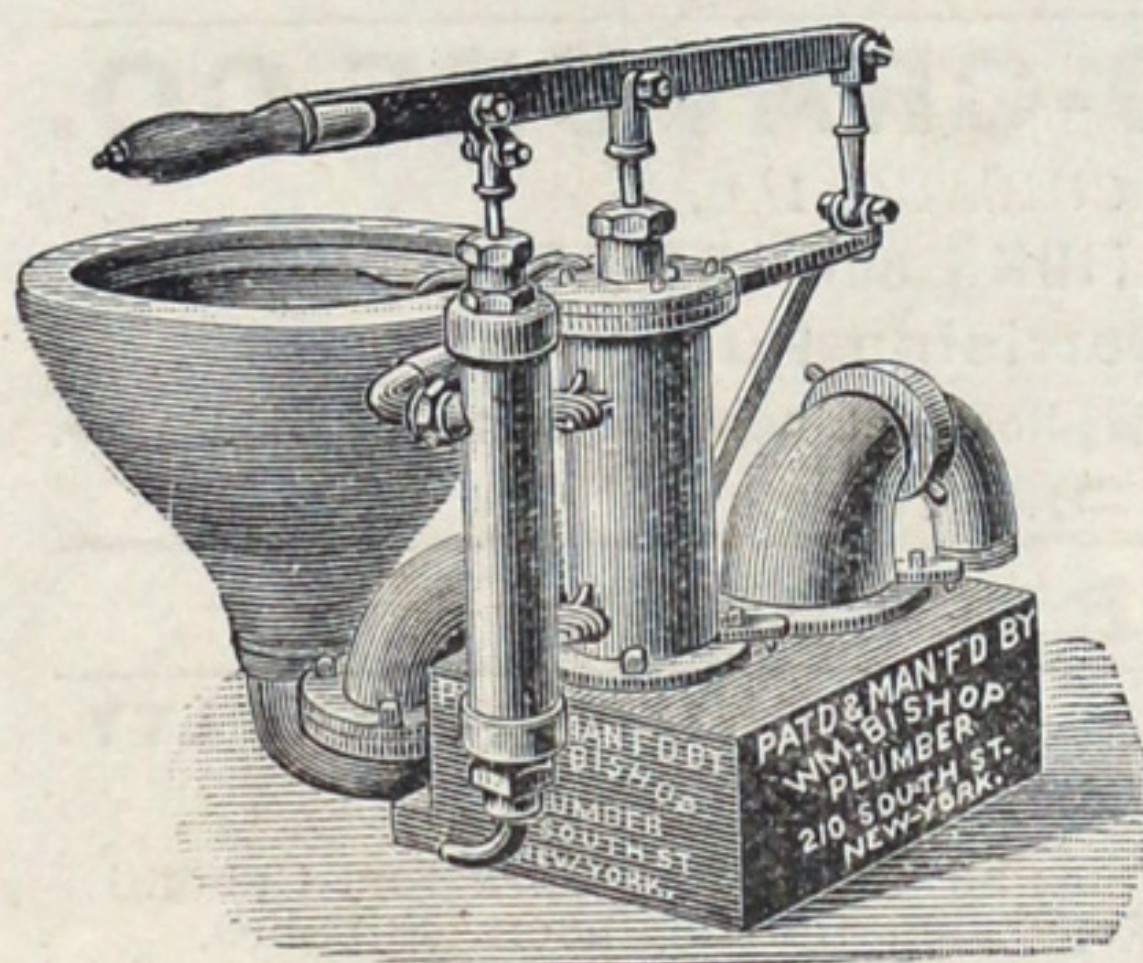
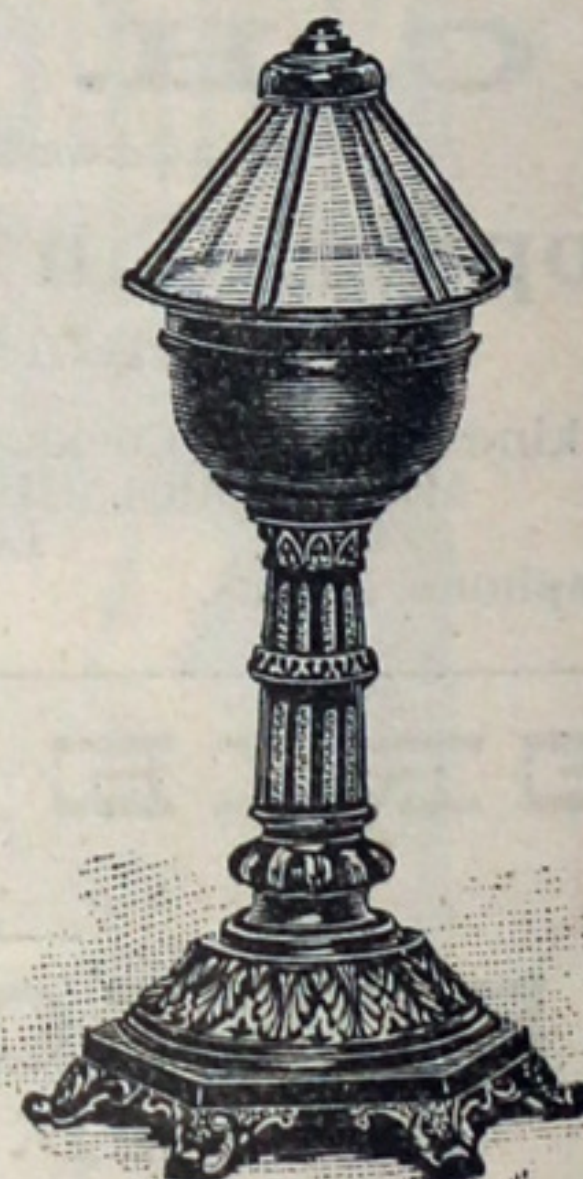
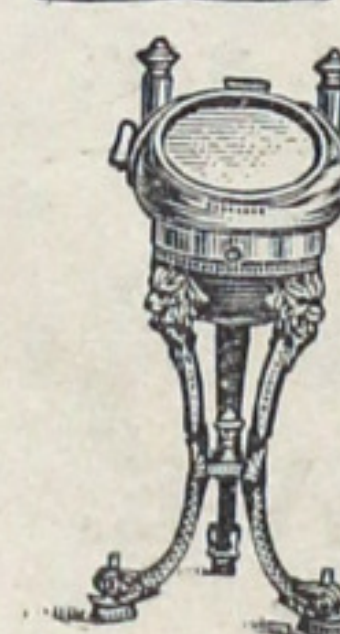
Outfits of Steamers
and Pleasure Yachts.

Compass Adjusters.

Send for Catalogue and
Almanac.

140 Water Street,
New York City.

Every attention given
to Trade orders.



Combination Pump and Water Closet

For above or below water line.

No valves or cocks to turn on or off.

WILLIAM BISHOP,

Plumber, Coppersmith and Steam Fitter,

210 South Street, NEW YORK.

Telephone Call, 4811 Cortlandt.

YACHT PLUMBING A SPECIALTY.

S. F. HODGE & CO.

MARINE ENGINES,
PROPELLER WHEELS,
DECK HOISTERS,
MARINE REPAIRS.

320 ATWATER STREET,
DETROIT, MICH.

CHICAGO RIVER. ENTRANCE.
18 FEET OF WATER AT DOCK. GOVERNMENT PIER.

INDEPENDENT COAL DOCK.

CHICAGO.

CAPT GEO TEBB
SALES AGENT.

79

T. G. WARDEN
D. E. RUSSELL
E. H. WILCE

VIRGINIA
MASSILLON
BLACK HORSE
JACKSON HILL

TELEPHONE 5140

BOATS FUELED DAY OR NIGHT BY STEAM DERRICKS

KNOWLES
Steam Pump Works.

93 Liberty St. NEW YORK. 113 Federal St. BOSTON.

IMPROVED PUMPING MACHINERY For Every Class of Work. Send for New Illustrated CATALOGUE

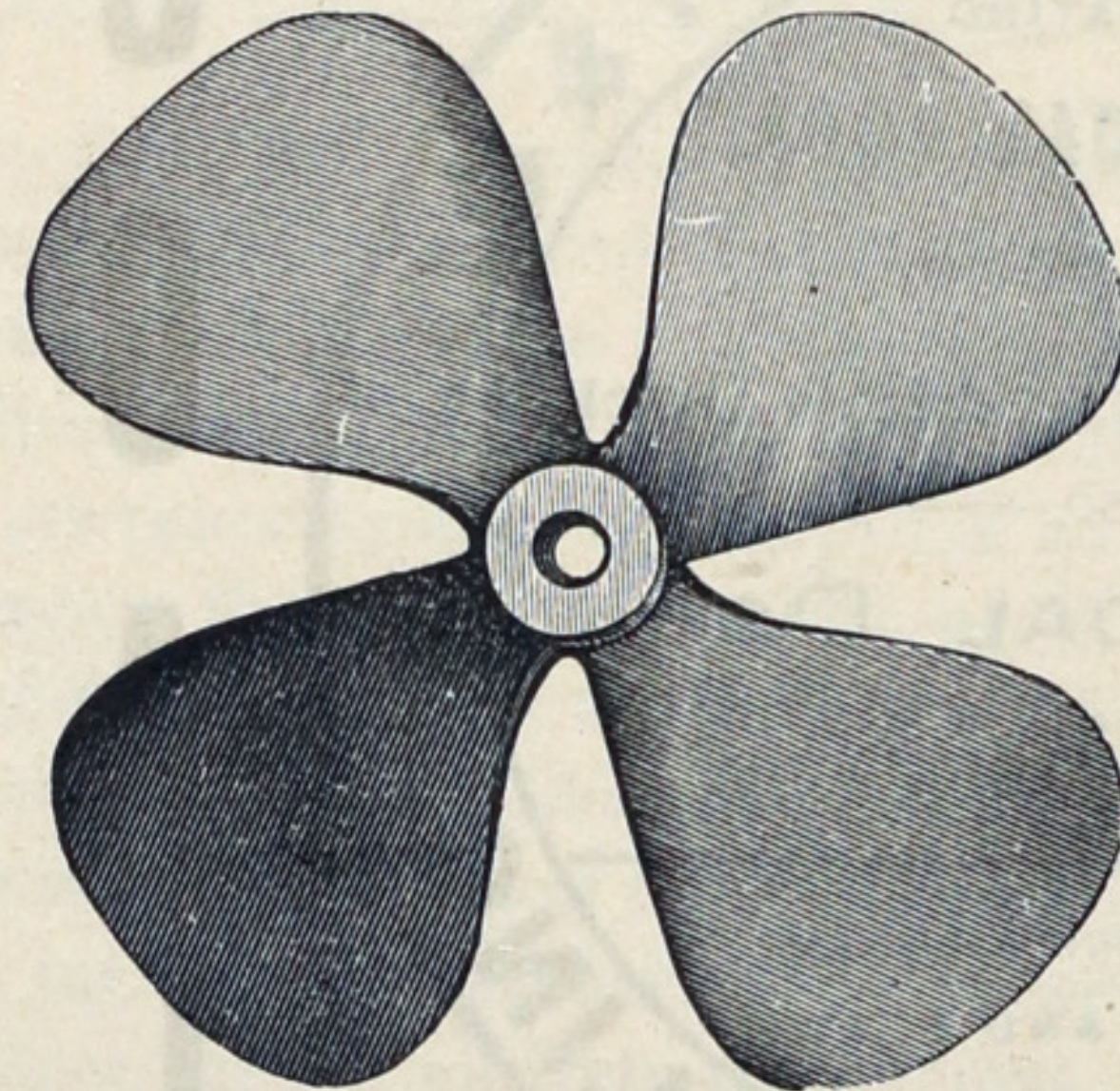
Avoid breakdowns, repair jobs, and expensive and vexatious delays, by the application of the Foster Steam Regulator and Governor to all auxiliary engines and pumps on your ship.

With this device, properly applied, racing, or undue speed, which is the greatest source of trouble, is impossible. Money refunded and expenses paid in every case of failure to operate as claimed.

More than 90 per cent. of the steamships constructed in the United States within the past two years, including all the U. S. Cruisers, are equipped with Foster Regulators.

Each auxiliary engine and pump on the Steamship Virginia, twenty in all, is provided with Foster Regulators.

SHERIFFS MANUFACTURING COMPANY,



C. STARKE, Pres. W. H. MEYER, V. Pres.
THOS. W. SHERIFFS, Manager.

Manufacturers of

MARINE ENGINES,

PROPELLER WHEELS,

Dredge Machinery of Latest Design.

MARINE REPAIRS AT ALL HOURS.

124, 126, 128, 130 & 132 Barclay Street,
MILWAUKEE, WIS.

Telephone 163.

MANISTEE IRON WORKS CO.

Manistee, Mich.,

MANUFACTURERS OF

**Marine and Stationary Engines
and Boilers.**

Triple Expansion, Fore and Aft, and Steeple Compound
Engines, and High Pressure Engines,

General Mill Machinery and Salt Well Outfits.

For full particulars, including hints on steamship equipment, write FOSTER ENGINEERING COMPANY,
81 Fulton St., New York.

Regulators for sale and will be supplied by :

The W. Bingham Co., Cleveland, O.

The Globe Iron Works Company, Cleveland, O.

C. H. McCutcheon, Buffalo, N. Y.

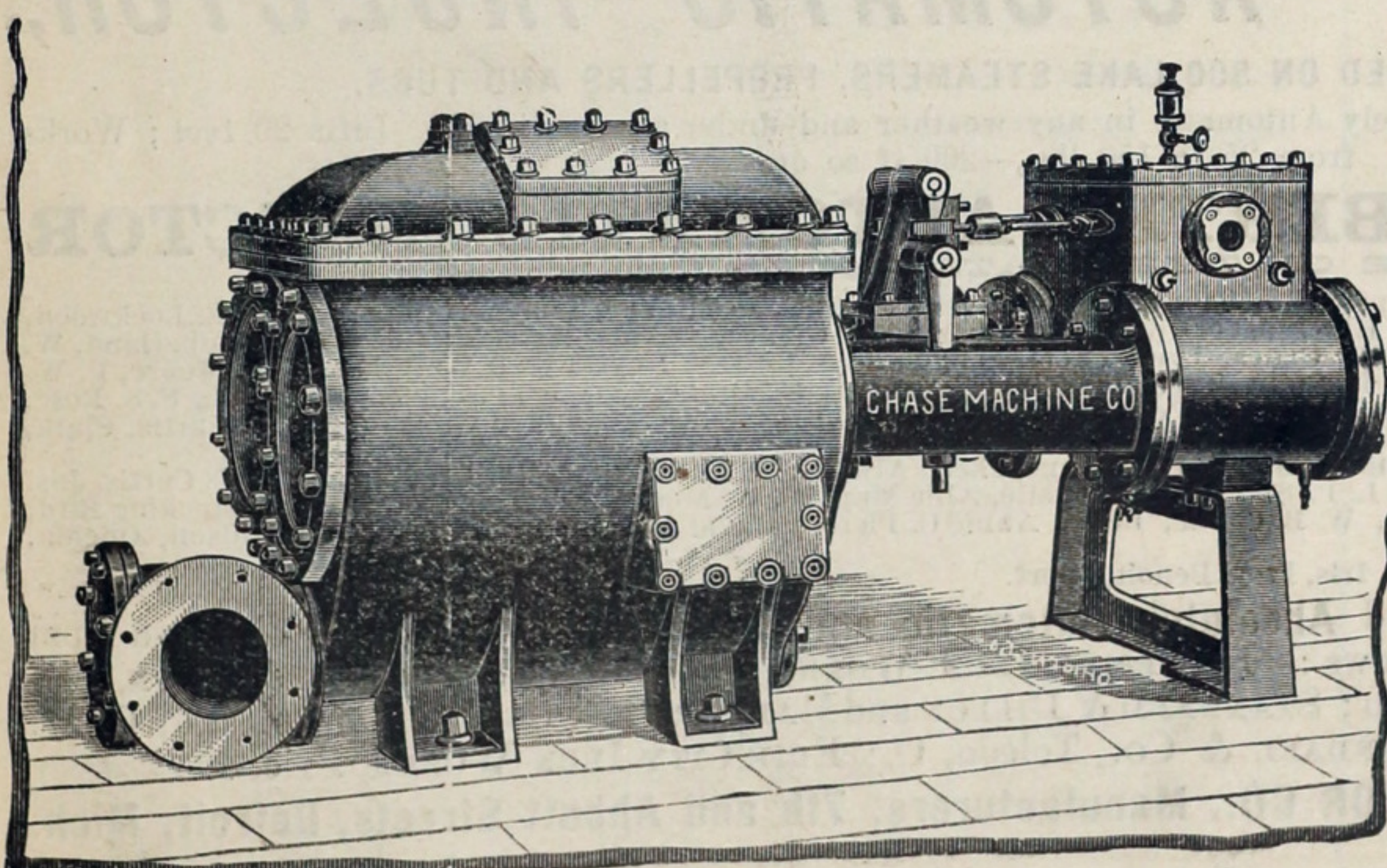
Detroit Dry Dock Co., Detroit, Mich.

Riverside Iron Works, Detroit, Mich.

Detroit Sheet Metal & Brass Works, Detroit, Mich.

Chicago Ship Building Company, Chicago, Ill.

American Steel Barge Co., West Superior, Wis.



THE CHASE MACHINE CO.,

111 Elm St., CLEVELAND, O.,

Machinists and Engineers,

MANUFACTURERS OF

Land and Marine Engines and Steam Pumps,

Sole Owners and Manufacturers of the

CHASE FOG WHISTLE MACHINE.

Special Attention given to Marine Repair Work.

ENGINEERS' SUPPLIES. ASBESTOS PIPE and BOILER COVERING.

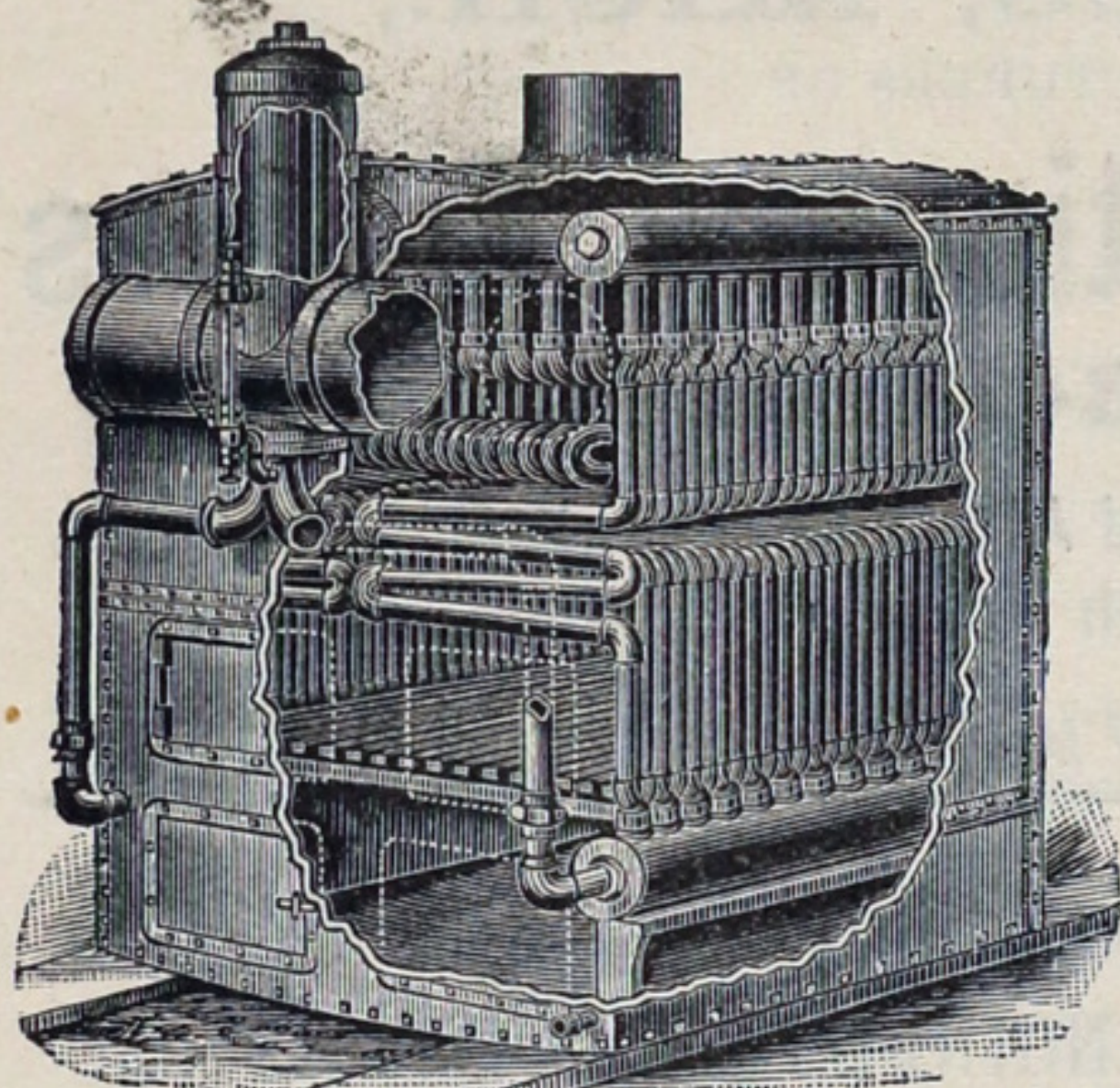
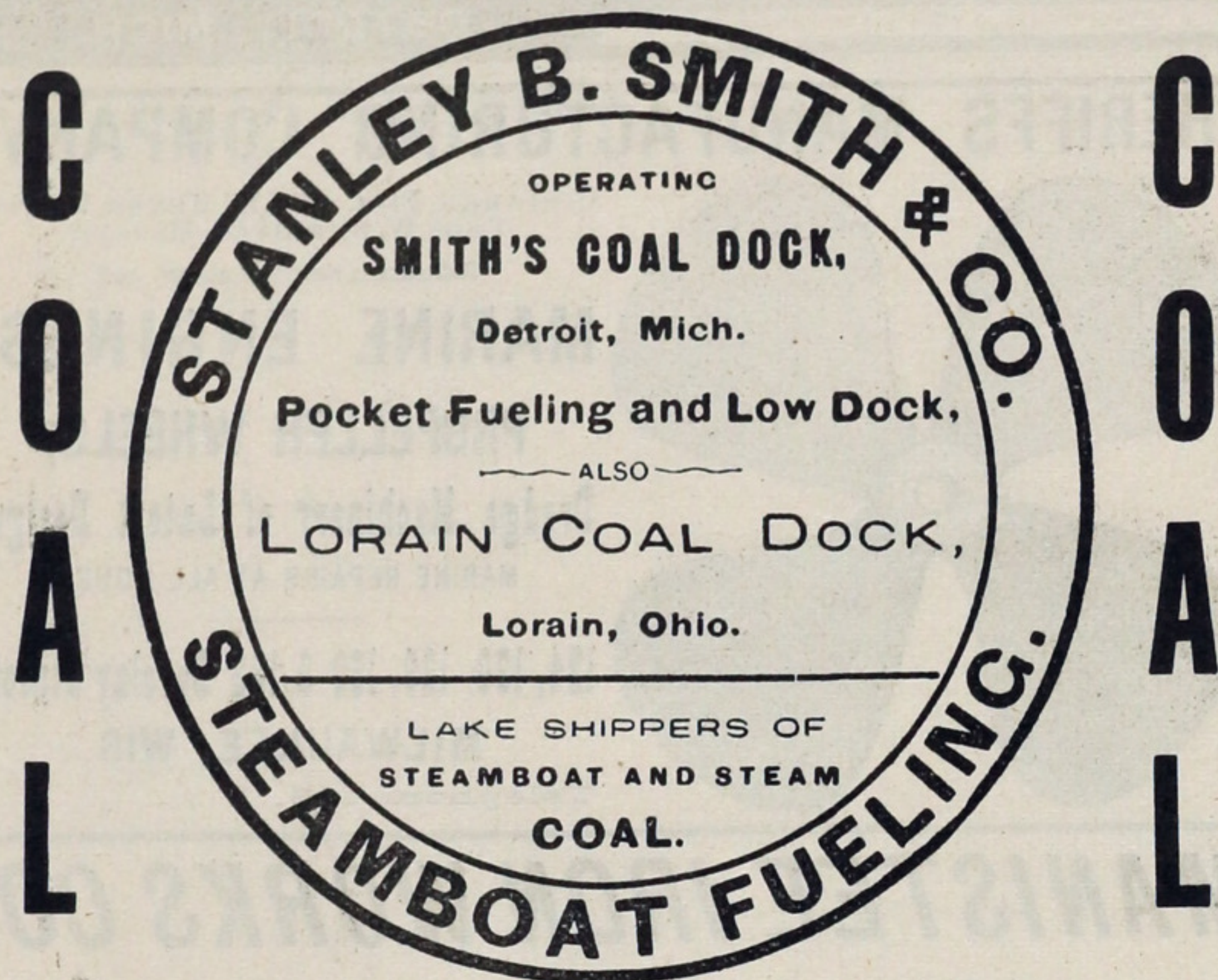
Agents for the J. L. Rubber Valves, and Leonard & Ellis' Valvoline.

Telephone 994.

KING IRON BRIDGE & MFG. CO.,

CLEVELAND, O.,

Hoisting and Conveying Machinery for Handling Ore, Coal, &c.



ALMYS'S PATENT SECTIONAL WATER TUBE BOILERS FOR MARINE and STATIONARY WORK

Manufactured by
ALMY WATER TUBE BOILER CO.
Providence, R.I.

"The use of boilers of the coil type in vessels of small displacement and enormously large power is already a necessity, and it will not be many years before their use will be general in all steam vessels."—Engineer-in-Chief Melville, U. S. N.

OMAR D. CONGER.

CHILION P. CONGER.

Conger & Conger, Attorneys and
Counsellors at Law,
No. 45 Corcoran Building, Washington, D. C.

We make a specialty of all Marine and Shipping Business before the Treasury Department and Congress. Patent Business. Practice, Court of Claims and U. S. Supreme Court.

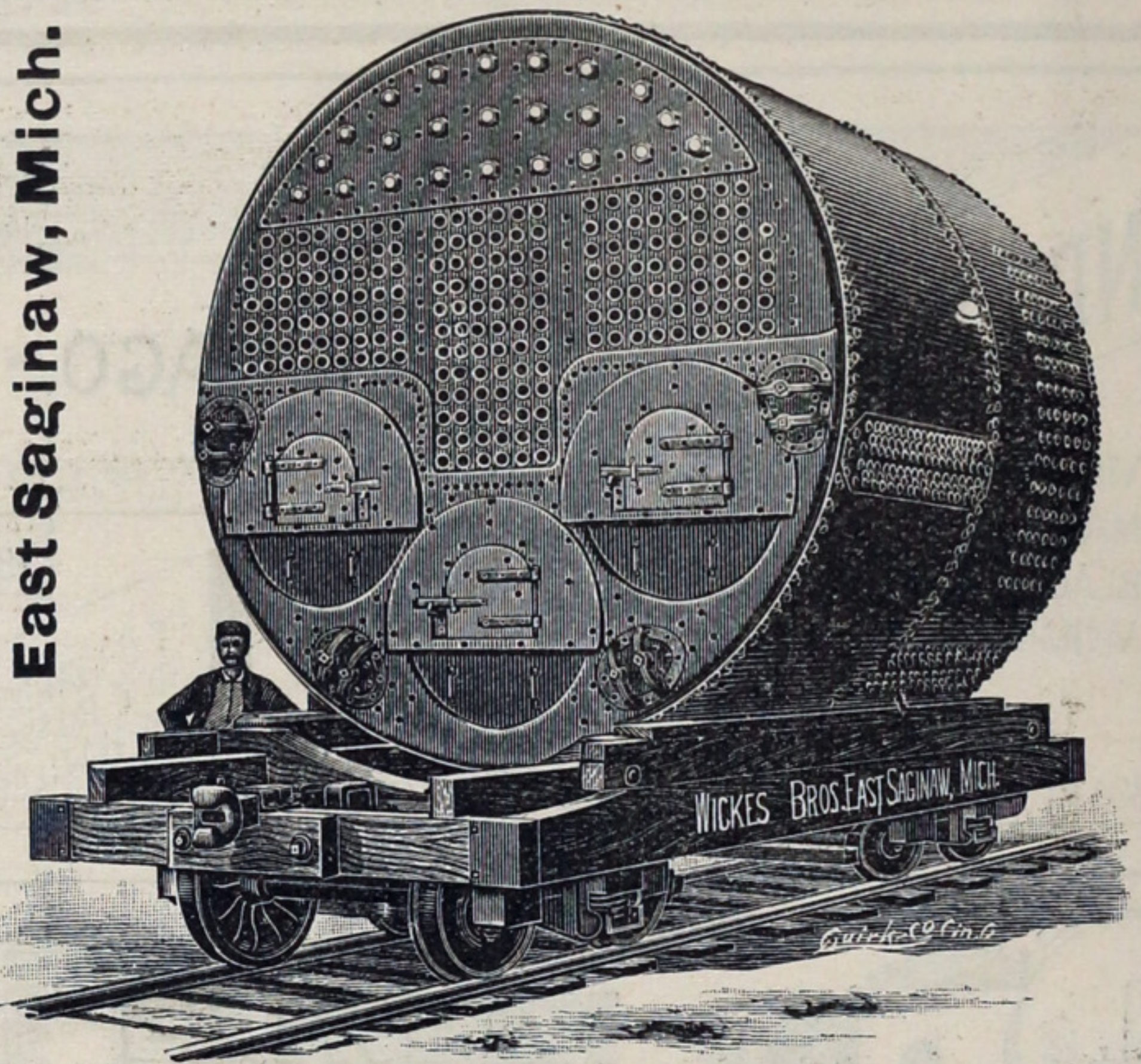
PATENTS

Patents Obtained in the UNITED STATES and FOREIGN COUNTRIES.

M. D. & L. L. LEGGETT

Attorneys at Patent Law,
Masonic Temple, CLEVELAND, OHIO.

WICKES BROS. BOILER WORKS
East Saginaw, Mich.



MARINE BOILERS
OF THE LARGEST TYPE A SPECIALTY.

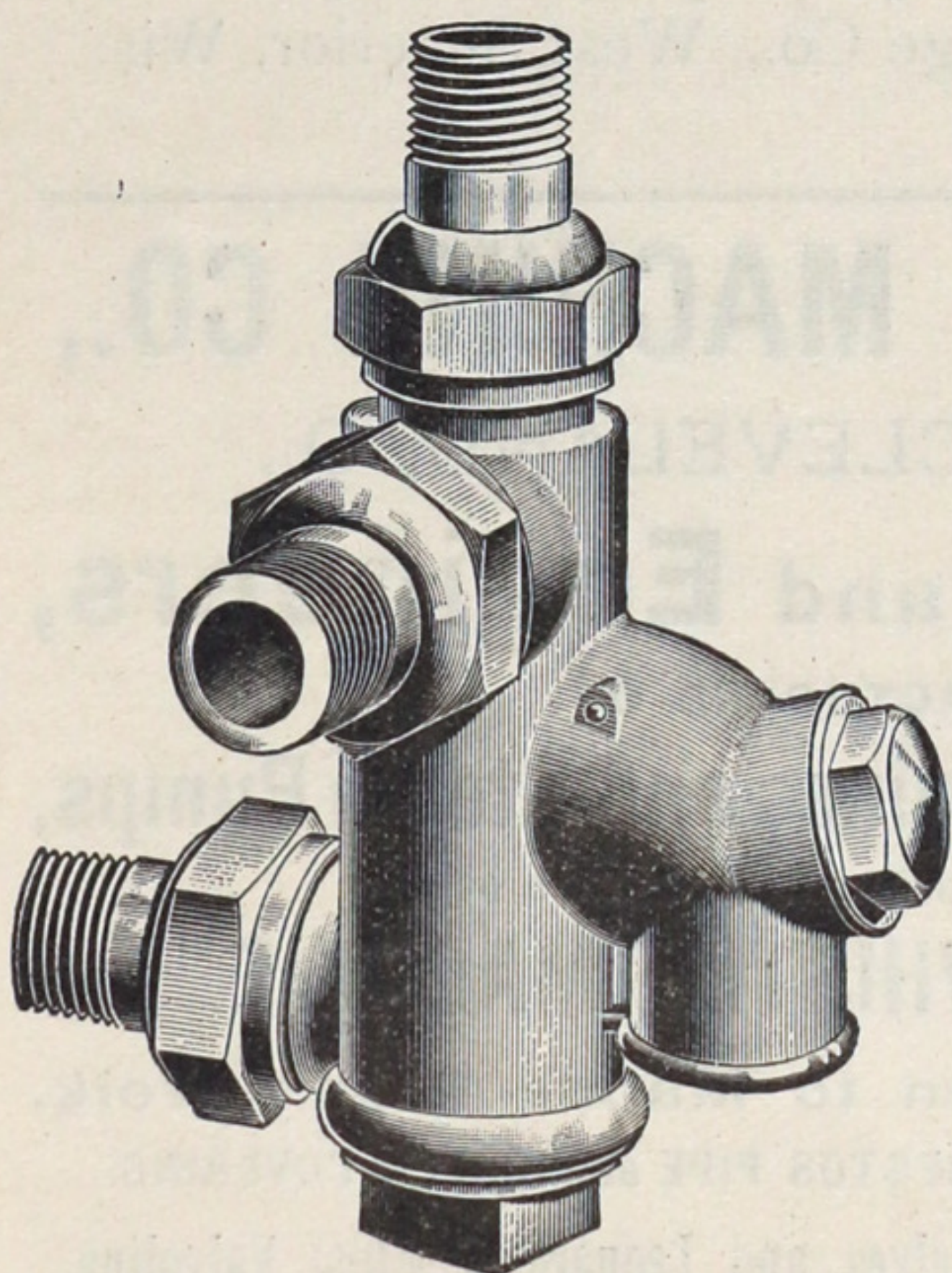
The Jenks Ship Building Co.

GENERAL SHIP BUILDERS,

Correspondence Solicited. PORT HURON, MICH.

THE CONDIT-FULLER CO.

BAR IRON, SHEET IRON, PLATE IRON, PIG IRON,
BOILER TUBES, BOILER RIVETS, PLATE STEEL,
GAS PIPE, BOAT SPIKES,
CLINCH RINGS, CLEVELAND, O. STEEL NAILS.



Have You Bought Your Injector?

IF NOT, TRY THE

PENBERTHY AUTOMATIC INJECTOR,

NOW BEING USED ON 500 LAKE STEAMERS, PROPELLERS AND TUGS.

Warranted Re-Starting and Absolutely Automatic in any weather and under all conditions. Lifts 20 feet; Works from 25 to 150 lbs.,—200 if so ordered.

We refer without permission to any Engineer using the **PENBERTHY AUTOMATIC INJECTOR**

SOME OF THE BOATS USING THEM:

STEAMERS—Skater, Maine, Panther, Harper, H. A. Tuttle, Oregon, Rhoda Stewart, Frontenac, Transfer, Chenango, C. B. Lockwood, Evalyn, John Lynch, Fashion, K. M. Hutchinson, City of Berlin, Masten, Glance, Prindle, Aztec, R. C. Wentz, Cumberland, W. H. Stevens, Oscar T. Flint, Viking, John Oades, Fred Pabst, Langell Boys, Colgate Hoyt, Byron Whitaker, J. W. Moore, F. W. Fletcher, Ferdinand Schlesinger, J. L. Colby, Tasmania, Schoolcraft, M. M. Drake, Geo. King, Lansing, Rudolph, F. S. Rose, S. C. Clark, Island Belle, Tice, Niagara, Susan E. Peck, J. C. Gilchrist, Iron Duke, Gettysburg, Livingstone, S. E. Curtis, Clara, Grace Dornier, Mary, N. Mills, Manistique, Nipigon, Miztec.

TUGS—D. L. Hebard, Maytham, A. J. Smith, James Hay, Pensaukee, Alva B., W. L. Chamberlain, Drednaught, C. C. Curtis, Jas. Amadeus, S. S. Stone, N. B. Gates, L. P. Smith, Chas. Castle, Allie May, W. W. Moore, Helene, Park, Torrent, Mocking Bird, Mollie Spencer, Geo. Hand, Sea Gull, W. B. Castle, Behn, Annie C. Pierce, David B. Hill, C. A. Charm, Donaldson, Oneida, Queen City.

YACHTS—Alex. M. Sloan, Despatch, Myra, Iris, Ivey, Benoit, Sport.

These Injectors are warranted **Absolutely Automatic and Restarting**, and can be obtained from any of our Lake Agents, as follows: RIVERSIDE IRON WORKS, Detroit; JAS. CLEMENTS & SON, Bay City; J. H. RUCKEL & Co., Buffalo; STANNARD & DILLON and MARINETTE IRON WORKS, Chicago; C. H. PRESLEY, Cleveland; SHAW, KENDALL & Co., Toledo, O.; ERIE CITY IRON WORKS, Erie, Pa.

PENBERTHY INJECTOR CO., Manufacturers, 7th and Abbott Streets, Detroit, Mich.